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WOOD®

THE MAGAZINE FOR HOME WOODWORKERS

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FEBRUARY 1989 • ISSUE NO. 27
Display until February 14

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Shop-tested instructions guarantee your success

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STAIN-RESIST FINISH LOOKS TERRIFIC
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Box-joint jig
Contemporary lamp
Perfume decanter

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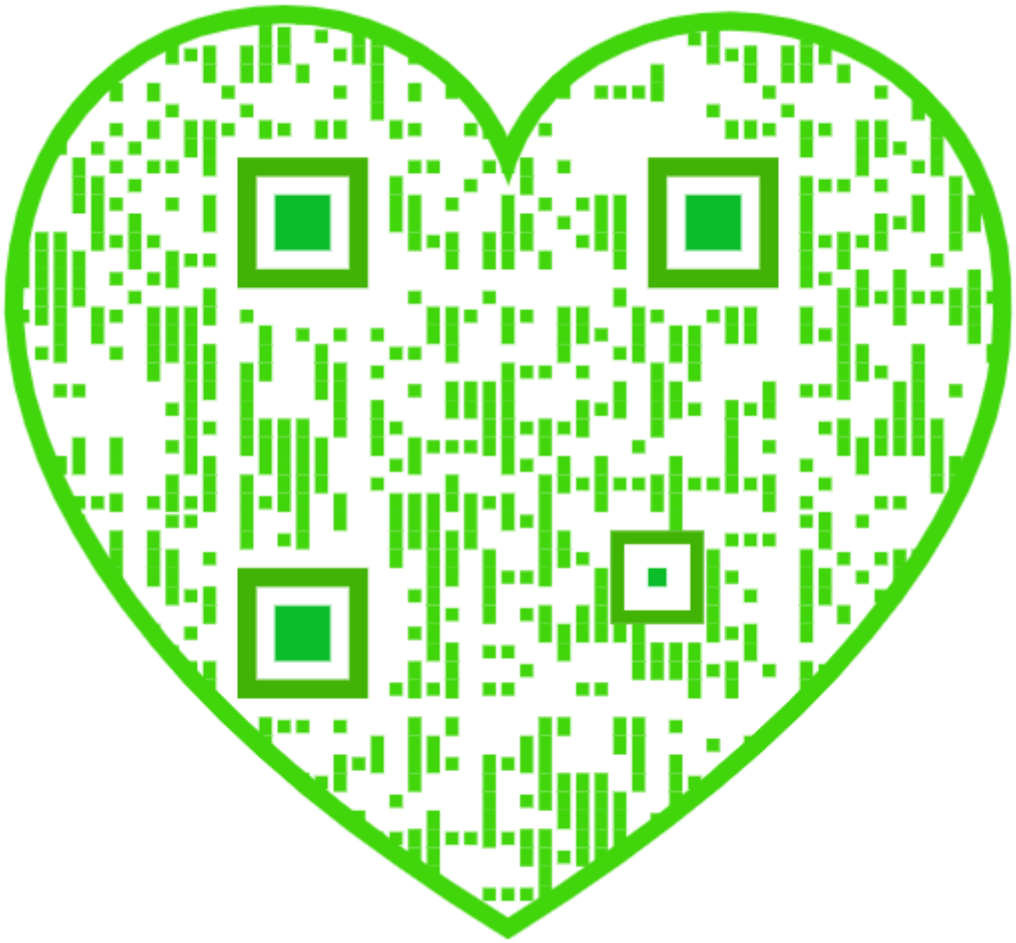

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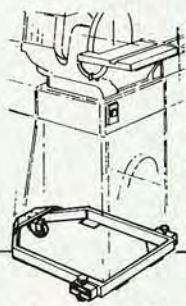

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THE WORLD'S #1 WOODWORKING PUBLICATION

This issue's cover wood grain: ponderosa pine

FEBRUARY 1989 ISSUE NO. 27

WOOD PROFILE

KOA: HAWAII'S HARDWOOD SOLDIER OF THE SEA 35

Once primarily used for outrigger canoes, koa—found only in our 50th state— now finds its way into furniture, sculpture, and yes, ukuleles.

SHOP-TESTED TECHNIQUES

STEP-BY-STEP RELIEF CARVING 36

This article has it all—carving basics to get you started, a fantastic grape-and-leaf design, and up-close, detail photographs to learn from. Carving has never been easier!

CRAFTSMAN CLOSE-UP

DON ADAMS, A MASTER BOWYER ROBIN HOOD WOULD HAVE LOVED 42

Why, in the Queen's name, would the Scottish Royal Company of Guards wait two years for longbows made in Oregon? Our featured craftsman has a band of loyal supporters who seek him out for authentic yew bows.

TRY STAIN-RESIST FINISHING FOR AN IRRESISTIBLE COUNTRY LOOK 46

Thanks to an enterprising Texas reader, we can share a terrific staining and finishing technique that will add distinctive accents to your country projects.

THE ACCURATE BOX-JOINT JIG 48

You'll marvel at how easily you can crank out finger joints with a jig designed by a Wisconsin dairyman.

OLD-HAND WAYS

ISHI:A LIVING WINDOW TO INDIAN CRAFTSMANSHIP 51

In 1911, archaeologists got a rare firsthand look at Stone-Age woodworking when a primitive Indian stumbled into California civilization.

KING CHERRY 52

The world's finest hardwood cherry thrives in Pennsylvania—at least for now. But today's foresters worry while deer nibble away at tomorrow's trees.

TORCHÈRE EXTRAORDINAIRE 58
In French, *torchère* means torch holder. In your home, our walnut-and-oak lamp means a distinctive way to light up a dark, uninspiring corner.

TURNING PATTERN
PERFUME DECANTER 63
An Oregon wood merchant has smelled success more than 10,000 times with stylish variations of hardwood perfume vials.

TOOL BUYMANSHIP
PORTABLE CIRCULAR SAWS 64
We looked at 20 models of portable circular saws and found a wide variety of sizes and features to choose from.

SHOP SKILLS
PUT A SUPER-FINE EDGE ON YOUR CARVING TOOLS 70
Learn how to make and use a strop—the same tool experienced carvers value to shave a lot of time and effort from their projects.

COUNTRY CRAFTS SAMPLER
A COMFY COUNTRY BENCH 72
Doweled joinery and heart cutouts accent this bench that sits as comfortable as it looks—and won't bruise your pocketbook, either.

CHARMING CABINET 76
Put our new stain-resist technique to good use to personalize this cabinet—you can build it for under $20.

ALL THE RIGHT INGREDIENTS 78
Finger joints accent a recipe box that we predict will find its way into many kitchens.

COUNTRY COUSINS 80
With our full-sized patterns, you can build models of yesteryear's milk truck and pickup.

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RE600 3hp VS plunge router 198
RA200 8-1/4" port. radial saw 238
R500 2-1/4hp plunge router 158
R501 2-1/4hp plunge router 158
BE321 3X21VS belt sander 118
JP-155 6-1/8" jointer planer 348
TS251U 10"mitersaw w/accykit 198

BOSCH

4X24 V.S. Belt Sander $189 1273DVS

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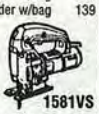
1272D 3X24 sander w/bag 169
3270D 3X21 sander w/bag 139



V.S. Top Handle Jig Saw $124 1581VS

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3258 3-1/4" power plane 139

3 HP Plunge Router $195 1611

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921VSRK 9.6Vcrdls w/clutch 139

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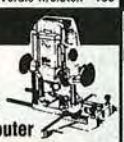

2-1/4 HP Electronic Plunge Router $269 3338

3304 1 hp. elec. plunge router 199
3375 3-1/8" universal planer 209
3380 jointer/spliner 349

Makita

3/8" V.S.R. Cordless Drill Kit $128 6093DW

3612BR 3hp rd. base router 199
LS1020 10" miter saw 249
410 dust collector 269

Milwaukee

V.S. Sawzall w/ case $129 6507

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0222-1 3/8 VSR 3.5 A drill 99
5397-1 3/8 hammer drill kit 139

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Mill-Route $279 MR1/MR-R1

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34-444 10" contr. saw compl. 599
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33-150 8-1/4" Sawbuck 498
34-670 10" motorized table saw329
50-179 3/4hp dust coll. w/drum349
* Price includes rebate.

18" V.S. Scroll Saw $659 40-601

40-150 15" bench scroll saw 139
23-700 wet/dry grinder 139
28-160 10" 3-wheel band saw 139
31-460 4" belt/6" disc sander 139
31-050 1X30 belt sander 69

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52B 52" homeshop fence 229
40B 40" homeshop fence 209
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24" Dovetail Jig $279 D1258-24R

D1258-12R 12" dovetail jig 249

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Jointing System w/ case $154 JS100

FB-100 16pc Forstner bit set 159
90-100 15pc router bit set 159
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94-100 5pc router cabinet set 159
EC-900 5pc shaper cabinet set 279

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360 3X24 sander w/bag 179
362 4X24 sander w/bag 189
330 Speed Bloc finish sander 59
505 1/2 sheet finish sander 109
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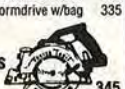

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9647 Tiger Cub w/ case 119
9629 VS Tiger saw w/case 135
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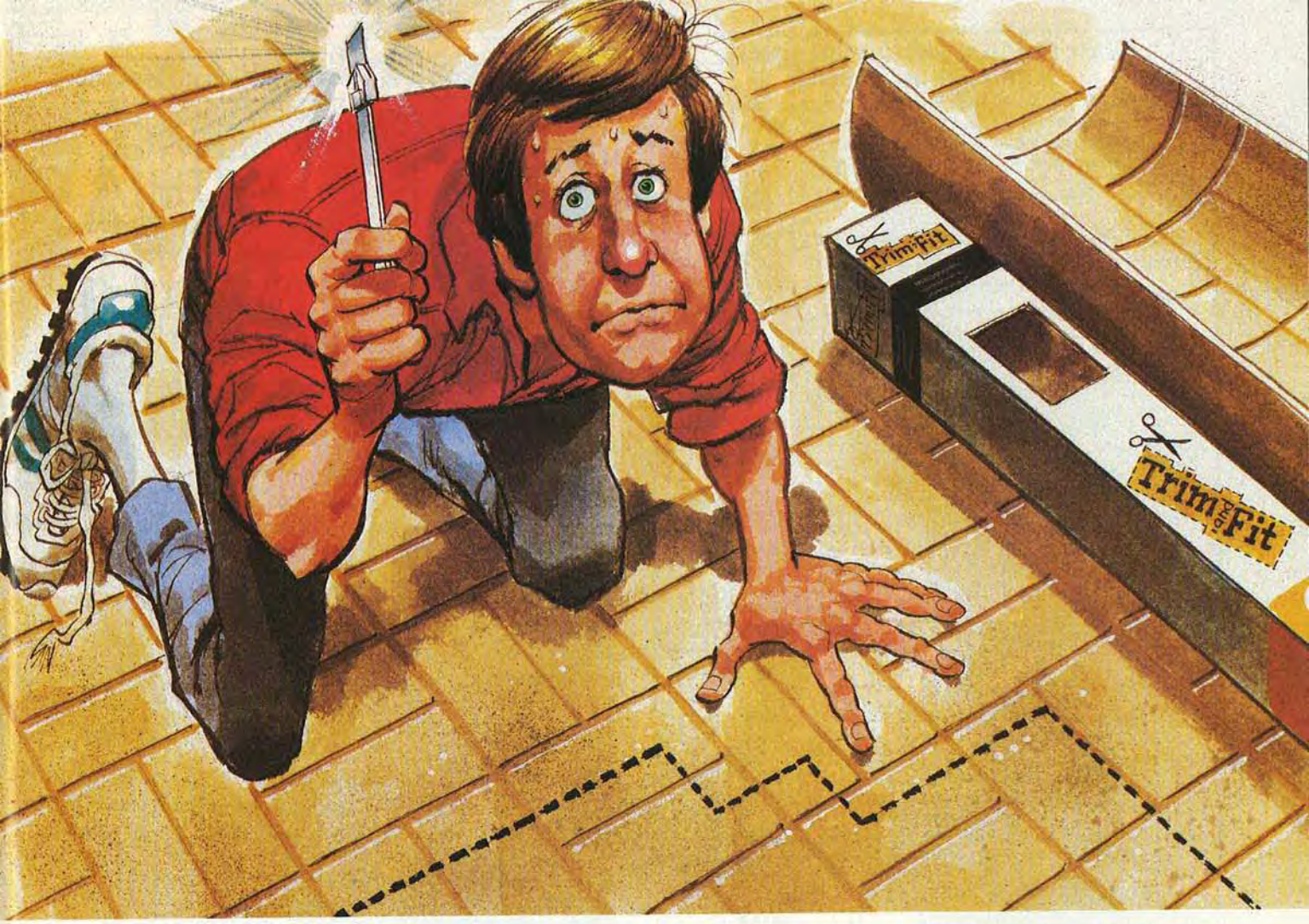

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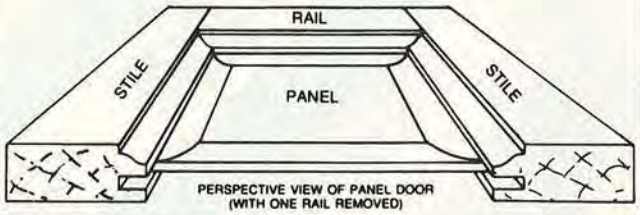

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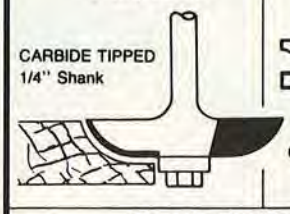

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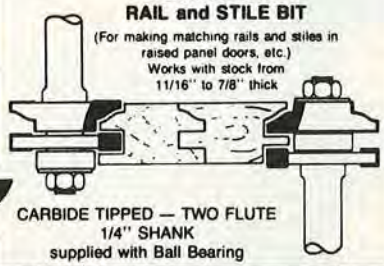

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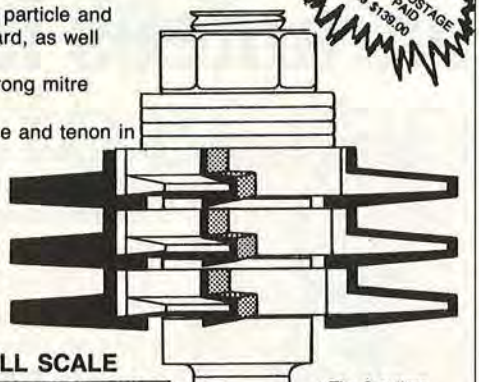

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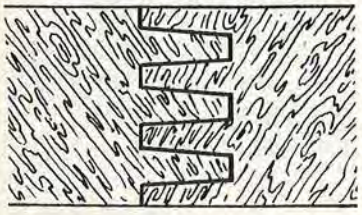

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THE EDITOR'S ANGLE

Staffers Darlene Reynolds and Jodi Downing trying to get control of yet another tidal wave of requests for project patterns and drill-press speed charts.

SERVICE WITH A SMILE... YOU BET!

It's amazing how many people don't understand the value of good customer service. If you're like me, sometimes you feel exceptionally lucky when you happen onto a sales clerk, a parking garage attendant, or another member of the service industry who acts like it's a pleasure doing business with you. Is it any wonder that some businesses have trouble showing a profit today? I don't think so.

Here at *WOOD*® magazine, we know that just providing you with an informative, entertaining product isn't nearly enough. It never has been! We know that we also must give you the very best service—from answering your questions about the material in the magazine to helping you deal with an occasional mix-up in the timing of your subscription renewal notice—to keep you as one of our valued readers. And it's our pleasure to serve you. In fact, it's that "we'll do anything to make our readers satisfied" attitude that I think makes our staff so special. Please allow me to share one example that shows how serious we are about serving your needs well.

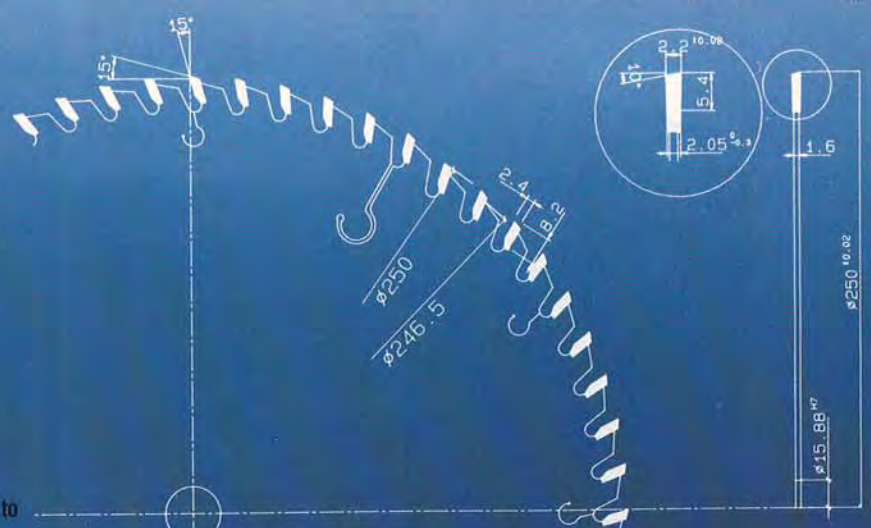
For well over a year now, we have been offering you lots of "little extras" in *WOOD* magazine—primarily full-sized plans for various projects and most recently our drill-press speed chart. Why? Because you deserve the very best we can give—even though it creates extra work for us. That's why I'd like to tip my hat to two of *WOOD* magazine's finest—Darlene Reynolds, our Administrative Assistant, and Jodi Downing, our Business Office Clerk. In addition to doing a great job with their other secretarial chores, these exceptionally good sports have orchestrated the fulfillment of all those patterns and drill-press speed charts you readers have requested—more than 26,000 to date.

Thanks, ladies, for going the extra mile for our readers—and doing it cheerfully. I know they appreciate it as much as we do.

Print this article

Larry Clayton

Thin Kerf. Advanced Design.



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Thin kerf blade compared to standard kerf blade

Freud thin kerf blades Rip (left), Crosscut (right)

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LU87M010	10" x 24 x 5/8"	.094 inch	$56.90
Stock Number	**Thin Kerf Crosscut**	**Kerf**	**Suggested Retail**
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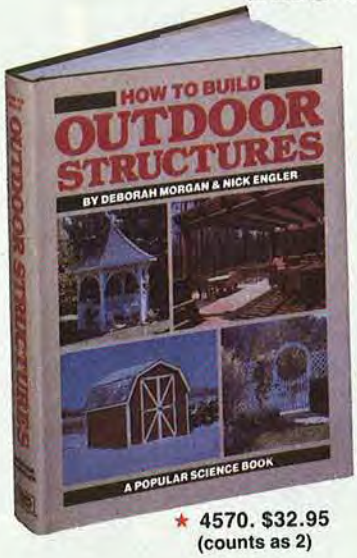

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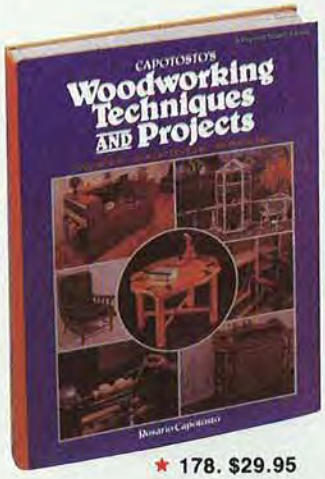

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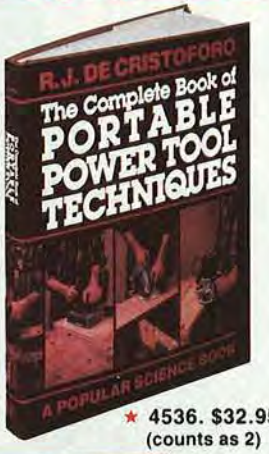

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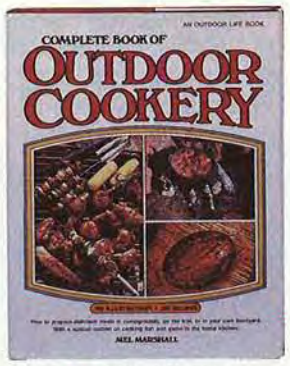

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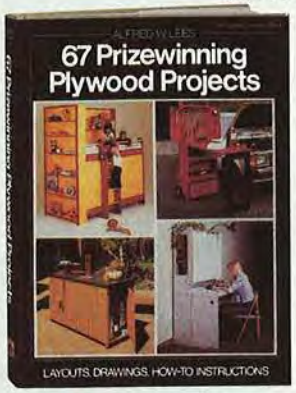

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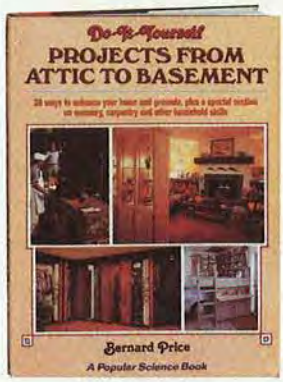

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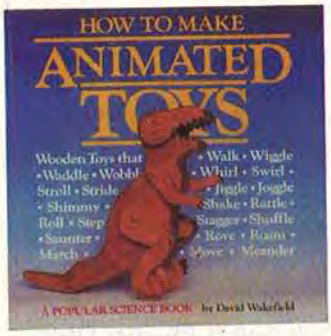

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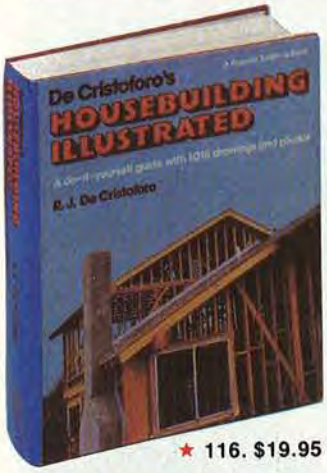

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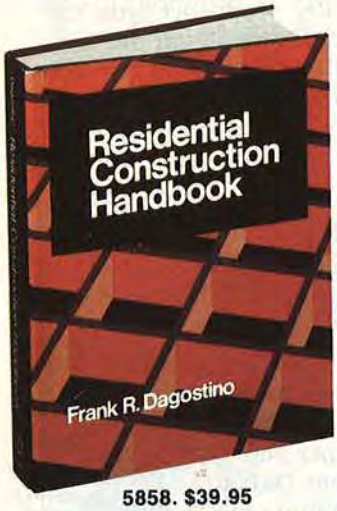

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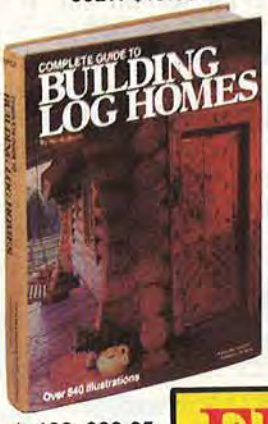

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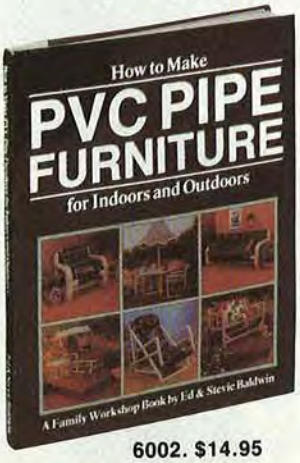

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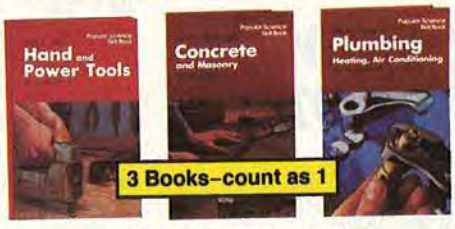

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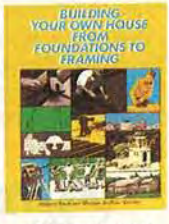

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TALKING BACK

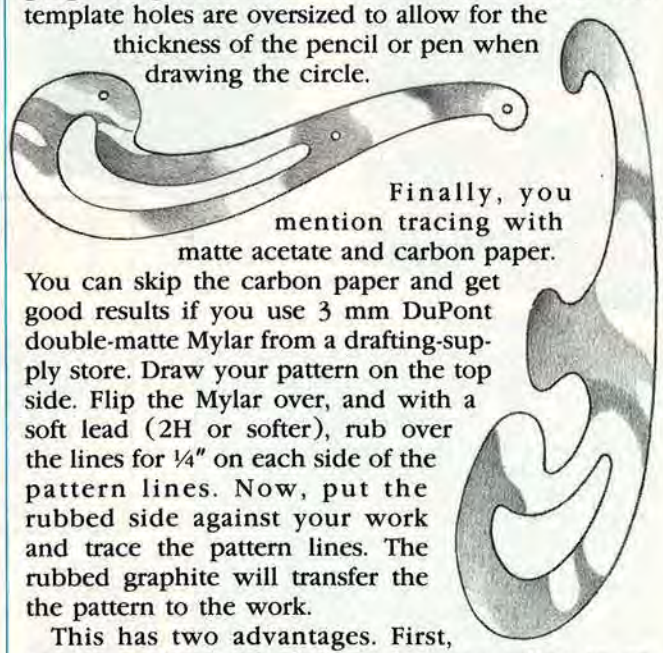
We welcome comments, criticisms, suggestions, and even an occasional compliment. The volume of mail we receive makes it impossible to answer every letter, but we promise to do our best. Send your correspondence to: Letters Editor, Better Homes and Gardens® *WOOD*® Magazine, Locust at 17th, Des Moines, IA 50336.

STRAIGHT TALK ABOUT FRENCH CURVES

I enjoyed the article on layout tools in the October issue of *WOOD* magazine. Here are three tips that might help other readers when using the tools:

First, you can use french curves to generate curves on both sides of some pieces of work; hence, one side becomes a mirror image of the other. The trick is to repeat the first curve on the second side. If you rub both sides of a french curve with 600-grit wet-or-dry sandpaper, you can pencil the exact curve segment directly on the frosted surface and have no problem when you flip over the tool to get the mirror image.

Second, remember to never use a circle template to gauge things such as holes, dowels, or dull bits. The template holes are oversized to allow for the thickness of the pencil or pen when drawing the circle.



Finally, you mention tracing with matte acetate and carbon paper. You can skip the carbon paper and get good results if you use 3 mm DuPont double-matte Mylar from a drafting-supply store. Draw your pattern on the top side. Flip the Mylar over, and with a soft lead (2H or softer), rub over the lines for ¼" on each side of the pattern lines. Now, put the rubbed side against your work and trace the pattern lines. The rubbed graphite will transfer the the pattern to the work.

This has two advantages. First, you don't have the waxy carbon-paper line to remove—the graphite will come off easily with a plastic eraser. And, you can see the wood-grain patterns of your workpiece since you rubbed graphite only on the lines you wish to transfer.

—Kim Standard, Morrow, Ga.

Jim Downing, our design editor, endorses all three of Kim's ideas. And, you readers must be eager for better patterns. The source we listed in the Buying Guide, Standardblue Artworld in Des Moines, has been flooded with requests for the layout-tool kit.

KUDOS FOR PICTURE-FRAMING ARTICLE

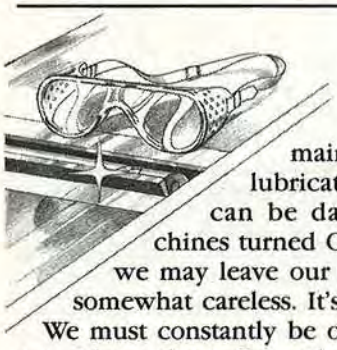
Thank you for using my suggestion for an article on picture framing in your October 1988 issue. Your writer Bill Krier had good advice from consultants Marlene Olson and Glenda Shaw. For the do-it-yourselfer, it was an excellent guide on how to frame correctly.

When one has opened up as many framed items as I have over the past 35 years, and seen what some so-called "professional framers" have done, then one can really see the need for good framing methods such as the ones listed in this article. More and more, people today are framing good art, limited-edition prints, and bits of family history for home decorations. Unfortunately, some people invest in artwork only to find out later that the value has dropped because of bad framing.

I think this was the best article I have seen in a nonart collecting-type of magazine. I think *WOOD* magazine is a good magazine for this article to appear in because many readers make frames and cut mats for their families and their friends.

Thanks again for a well-done article on a needed subject in a well-done magazine. Keep up the good quality and work.

—Richard Osborn, Oshosh, Wis.



BLADES REMAIN SHARP—EVEN WITH POWER OFF

Performing routine maintenance such as waxing, lubricating, and general cleaning can be dangerous even with machines turned OFF. With the power OFF, we may leave our guard down and become somewhat careless. It's an easy trap to fall into.

We must constantly be on the ball while working around our shops. Recently, while waxing my jointer tables, I took what I thought was the proper precaution by unplugging the machine. Imagine my surprise and pain when I sliced my finger as my hand passed over the raised 6" jointer blade that I had neglected to lower.

Here's one additional safety tip. I purposely leave a pair of safety glasses in the way at each stationary power tool so that I have to move the glasses before using the tool. As it works out, my nose happens to be a convenient resting place for these glasses.

—Alan C. Sandler, Garnerville, N.Y.

Well-taken points, Alan. We bet you're not the first person nicked by a nonmoving blade. All razor-sharp power tools demand constant awareness.

Continued on page 12

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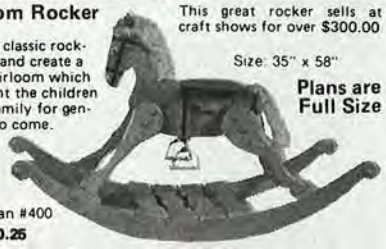

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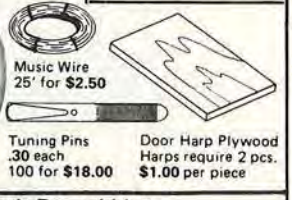

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TALKING BACK

Continued from page 11

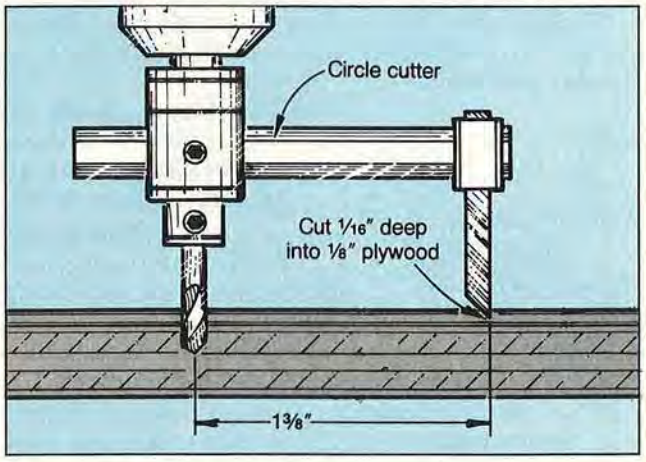
TWO RETAILERS CLOSE THEIR DOORS

Tools-To-Go, a mail-order tool firm, has shut its doors and vacated its building in North Miamai Beach, Fla. If you have paid for but not received merchandise ordered from the firm, please contact the Florida Department of Agriculture and Consumer Affairs, Division of Consumer Services, The Mayo Building, Tallahassee, FL 32399.

In "Finishing Touches" in the October 1988 issue of *WOOD* magazine, we mentioned that Mahogany Masterpieces of Suncook, N.H., imported the Swiss-made Reinhard tablesaw. The Small Business Administration and the State of New Hampshire Attorney General's Office have filed actions against the now-defunct corporation and its owner, Robert Major. If you have a complaint against the firm, contact The Office of the Attorney General, 25 Capitol Street, Concord, NH 03301. At the present, we know of no other importers of the $26,960 Reinhard saw.

FOR A RADIUS, DIVIDE DIAMETER IN TWO

In the Christmas-ornament article on page 68 of the December 1988 issue, a drawing incorrectly showed the 1⅜" circle radius with a measurement for the circle diameter. The corrected drawing appears *below.*



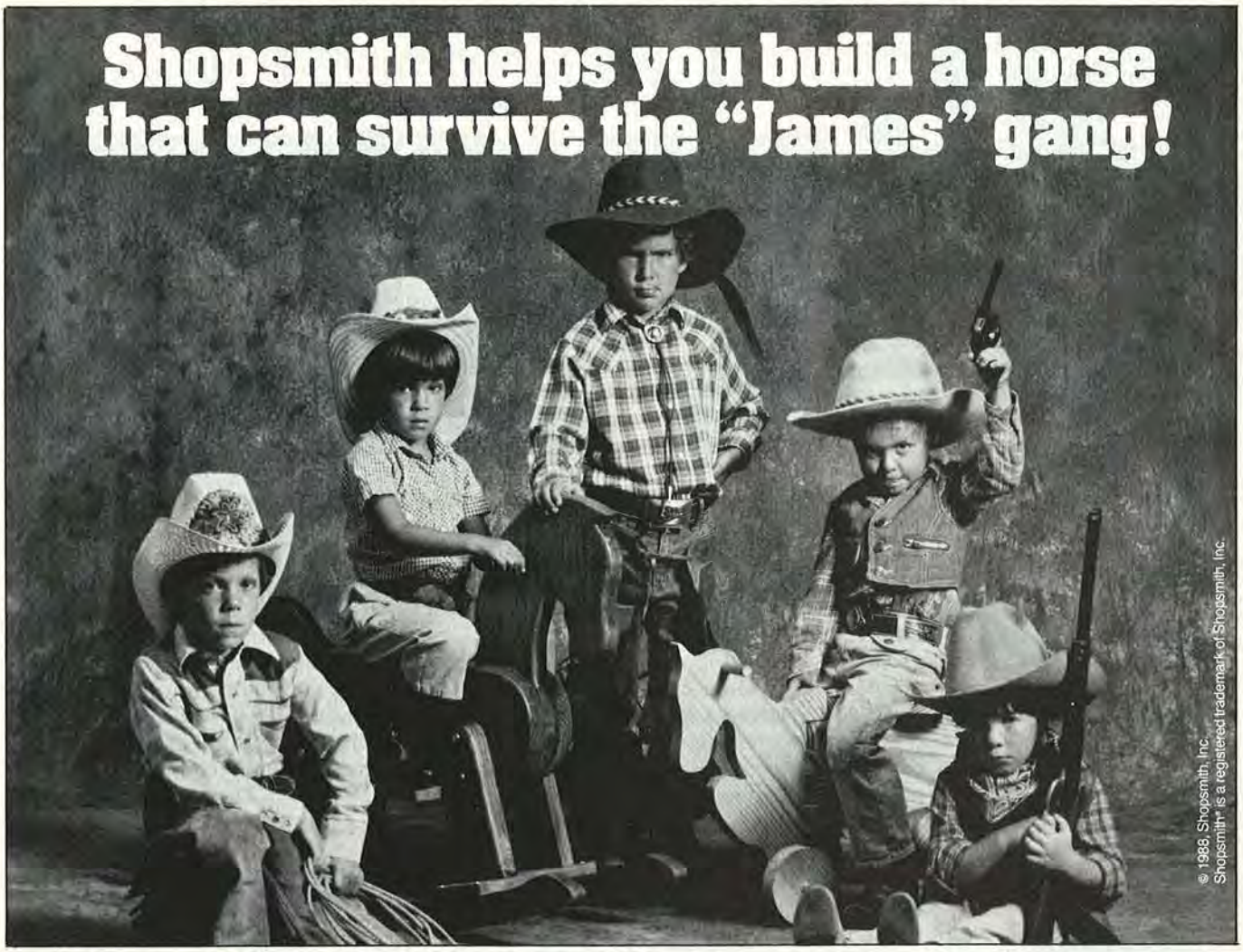
BRIAR BY THE BLOCK

The article "Up In Smoke" in your December 1988 issue of *WOOD* magazine was very enlightening to me. I have enjoyed both woodworking and fine pipes for years, but have never combined the two. Where can I buy briar, stems, and other supplies?

—Edward A. Scott, Dyer, Ind.

Sorry about that, Ed. Our intent was to publish a source, as we always try to do. However, in editing the copy, we inadvertently deleted the information. Al Baier suggests obtaining briar and pipe-making supplies from: Pimo, Inc., Dept. BHW, P.O. Box 482, Skokie, IL 60077. Pimo also sells Pimo's Guide to Pipe-Crafting at Home, *an 112-page paperback, for $10.65 ppd. (Illinois residents add 70 cents).*

Shopsmith helps you build a horse that can survive the "James" gang!



James and his gang are a bunch of rootin', tootin', tough customers when it comes to their toys. But they're no tougher than these hand-built, solid oak broncos Jimmy's Dad made. They'll take years of hard ridin' on the trails from Abilene to Dodge City!

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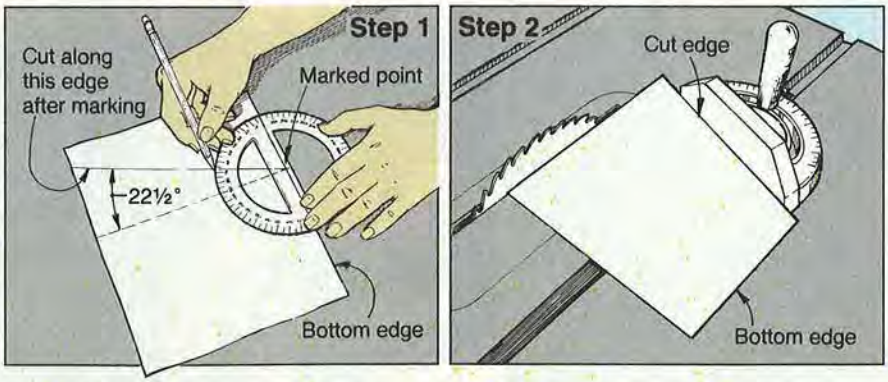
PRECISE MITER CUTS EVERY TIME

Accurately setting the miter gauge on a tablesaw for an odd-degree cut, such as 22½° from center, is nearly impossible without the help of a measuring tool such as an adjustable triangle. You can buy such an instrument for about $10, or you can be just as accurate with much more common materials.

TIP: You'll need a protractor, scissors, pencil, straightedge, and sheet of heavy paper or thin poster board. First, mark a point about halfway across the bottom edge of the piece of paper. Then, lay the protractor along that edge, with its center over the marked point you just made. Now, mark a second point at the outside of the protractor at the desired number of degrees from the 90° mark as shown in Step 1 *above*. For this example, since we want a 22½° angle, we marked the second point at 67½° (90° minus 22½°). Connect the two points with a straight line that goes across the page, and use scissors to cut along the line, following it closely.



Moving to your tablesaw, keep the same face of the paper up and place its bottom edge away from the blade, with the just-cut edge facing the miter gauge. Move the edge nearest the blade flush against it and align the fence of the miter gauge with the cut edge as shown in Step 2 *above*. You can set the miter gauge for the same number of degrees from the other side of center by simply flipping the sheet over and placing the base edge along the blade. You may want to apply the piece of paper to a sheet of hardboard and cut it to shape for future use as a template.

—Ray Russell, Des Moines

MAKE FAST WORK OF LAMINATING

Applying plastic laminate to two faces of a cabinet door, shelf, or other stock eats up a lot of your time when you do one side first, then wait for it to dry before covering the second side.

TIP: You can apply the laminate to both sides almost simultaneously. First, drive brads or small finishing nails into the corners of the stock, as shown *below right*. Apply contact cement to this side and then turn over the stock so the nails support it. Now, apply cement to the other face and to the two pieces of laminate you have prefit. Allow the cement to dry until tacky, and place the first piece of laminate on the side without nails. Flip the stock over, pull out the nails with pliers, and carefully lay the second sheet of laminate in place. Allow the cement to cure.

—Roy T. Higa, Honolulu

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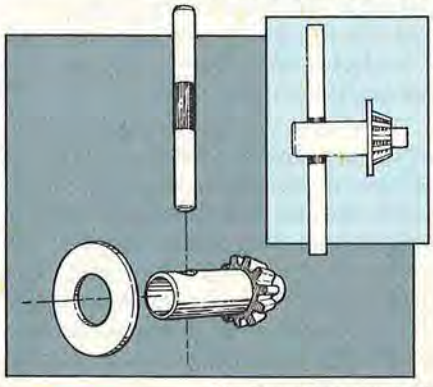
SIMPLE CHUCK KEY GUARD

Getting your fingers caught between the teeth of a drill chuck and chuck key (it happens to the best of us!) can add a mighty painful twist to tightening a bit.

TIP: Slipping a washer between those grinding teeth and your fingers neatly solves this problem. Use a partially open vise or a small anvil to support the chuck key, as you gently hammer the handle out of the key (you may need a small punch to remove it completely). Now slip on a large metal washer to act as a shield and tap the handle back in place.

—Louis Mouis, Aurora, Ill.



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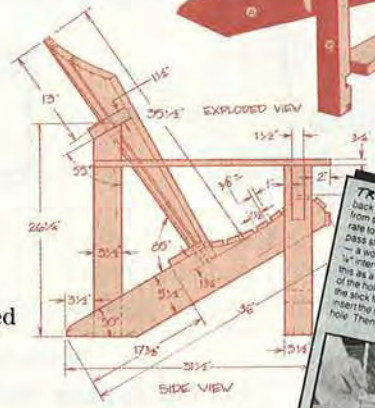

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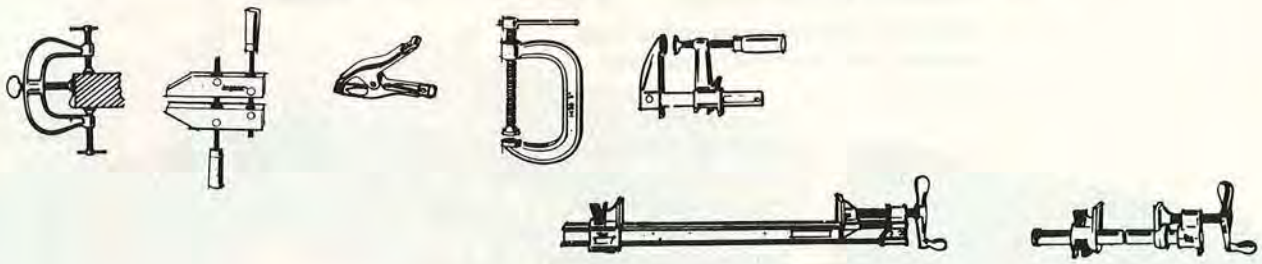

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TIPS FROM YOUR SHOP (AND OURS)

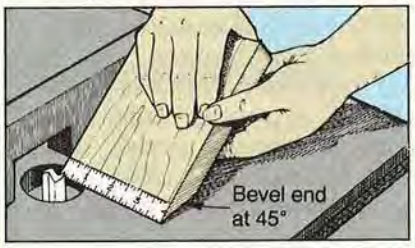
Continued from page 14

HANDY GAUGE FOR ROUTER-FENCE SETTING

The bit clearance cutouts in some router fences make it difficult to use a rule to determine accurate bit-to-fence spacing.

TIP: A 3×6" piece of ½" plywood makes a good base for a gauge. Cut a 45° bevel on one end of the stock and glue or tack a section of tape measure as shown below. Held perpendicular to the fence, this gauge assures accurate measuring. Held vertically, it reads elevation of the bit. This gauge also comes in handy for setting the rip fence on a tablesaw.

—Eben H. Gustafson, Martinsburg, W.Va.

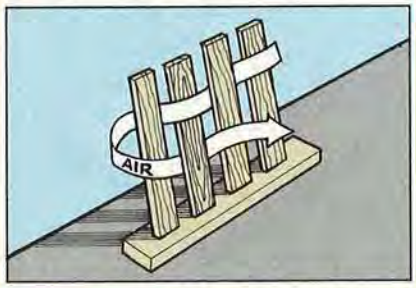


DON'T LET WOOD GET BENT OUT OF SHAPE

Freshly resawed or planed stock will almost certainly warp when allowed to lie facedown on a flat surface for as short a time as one hour (even faster in dry climates). Moisture will escape from the exposed face of the board at a faster rate than from the side facing down. You would have the same unpleasant consequence if you finished one side of a piece and left the other side unfinished.

TIP: Stand the piece(s) on end so air can flow along all surfaces. Leaving wood this way overnight allows the stock to restabilize.

—From the WOOD® magazine shop



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TIPS FROM YOUR SHOP (AND OURS)

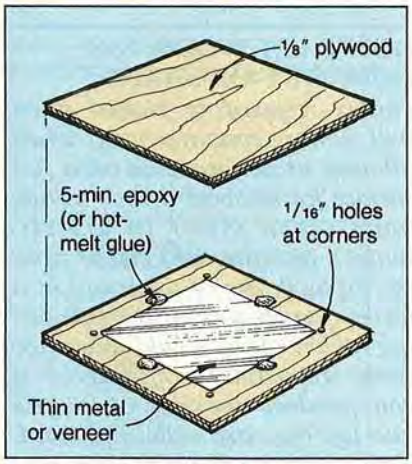
Continued from page 19

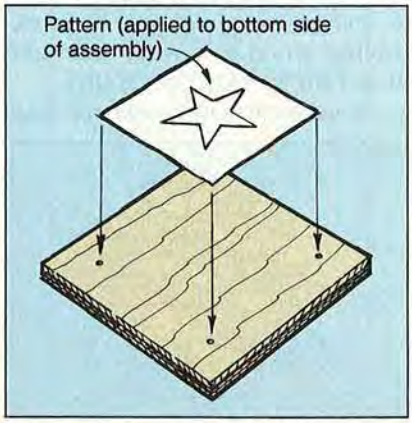
A SANDWICH FOR CUTTING THIN METAL AND VENEER

It's difficult to make good, clean cuts in thin metal, plastic, or veneer with a bandsaw or other saw because the flimsy material may bend or even get caught in the saw blade. As a consequence you might ruin the stock or possibly injure yourself.

TIP: Place the thin material between two pieces of ⅛" plywood or similar thin stock, held together with dabs of five-minute epoxy or hot-melt adhesive. Before assembling the sandwich, drill 1/16" holes at the corners of the thin material so you'll know its position inside the plywood pieces. Tape or glue the cutting pattern to the bottom side of the assembly as shown *below bottom*, and then flip the piece over before you start cutting. If you've made vertical cuts, the pattern portion should drop out with little effort.

—From the WOOD® *magazine shop*





Continued on page 22

WOODWORKERS HARDWARE
WHOLESALE ORDER FORM

Projects you can build in a single evening

Grocery List Project

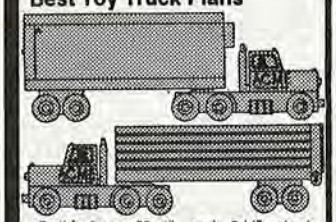
You can make these 16" high Grocery List Projects from standard 3/4" thick lumber.
We supply the Full Size blueprint together with enough Grocery Lists (500 sheets) and Brass Plated Bolt Sets (10 sets) to make 10 projects. Grocery Lists are 11" long and are printed on peach colored paper with a rich brown ink. Duck cutout and 3/4" wood are not included in kit.
#7453 Country Grocery List Package $14.55/EA
#09451 Wood Cutout Ducks 3-3/4" ..... $.49/EA

Doll Stroller

Build this Doll Stroller from 3/4" pine and 1/4" plywood. Extremely easy to build from our Giant Plan Set. Fits 15" high dolls.
#W124 Doll Stroller Plan $3.50/EA

Hardware Kit
Special Kit includes 4-1/2" Stroller Wheels, Axles, Wood Spindles, Screws, Wood Plugs, and Dowel Rod. Plan and other wood parts needed are not included with kit.
#1538 Doll Stroller Hardware Kit $5.22/EA

Best Toy Truck Plans



Build from "2x4" and 3/4" stock. Huge 22" x 34" plans for 2 trucks.
#W144 Truck Plans $4.00/EA

Truck Hardware Kit

46 piece kit includes 2" Wood Wheels, Axle Pegs, Window Decal Set, and Misc. Wood Turnings for Head Lights, Clearance Lights, Radiator Cap, Gas Tanks, and Differential Cover. Enough hardware pieces to build one truck from plan above. Plan and other wood parts needed are not included with kit.
#1950 Truck Hardware Kit $7.50/EA

Hardwood Toy Wheels

#W050100 1/2" ..... 1/8" Hole..... $3.20/100
#W075100 3/4" ..... 1/8" Hole..... $3.50/100
#W076100 3/4" ..... 3/16" Hole..... $3.50/100
#W087100 7/8" ..... 1/8" Hole..... $4.70/100
#W100100 ..... $6.00/100
#W125100 1-1/4" $8.00/100
#W150100 1-1/2" $11.00/100
#W175100 1-3/4" $15.60/100
#W200100 2". $19.50/100
#W22520 2-1/4" $7.30/20
#W25020 2-1/2" $8.80/20
#W27520 2-3/4" $10.20/20

Axle Pegs

#AP1 Fits 1" - 2" Dia. Wheel $4.10/100
#AP4 Fits 2-1/4" - 2-3/4" Dia. Wheel..... $1.60/20
#AP6 Fits #W076100 ..... $3.00/100

2" Wood Wheels With Tread Grooves

#705020 Front.. $6.30/20
#7050100 ..... $25.50/100 (Order #AP4 above)
#705120 Dual Rear $10.50/20
#7051100 ..... $42.90/100
#AP5 Axle Pegs for Dual Rear Wheel ..... $1.98/20 ..... $9.00/100

Birch Shaker Pegs

#7226 3-1/2". $15.00/100
#7280 2-1/2"..... $1.90/10 ..... $13.90/100
#7227 1-3/4"..... $1.10/10 ..... $7.60/100

Oak Shaker Pegs

#SKP2 3-1/2" ... $3.35/10 ..... $28.00/100
#7261 1-3/4"..... $2.00/10 ..... $15.00/100

Mug Pegs

#MGP1 3-3/8"..$2.70/10 ..... $25.00/100

Birch Country Pegs

#1770 3-1/2"..... $1.80/10 ..... $13.00/100

Birch Spindles

#S6 5-3/4" ..... $.49/EA
#S85 9"..... $.85/EA
#S110 11"..... $1.35/EA

Birch Dowel Pins

#1142 1/4" x 2" $1.90/100 ..... $8.50/500
#1382 3/8" x 2" $2.00/100 ..... $9.25/500

Oak or Birch Galley Spindles

#S1 Birch 1-1/8" ..... $1.30/10 ..... $9.00/100
#S4 Birch 1-1/2" ..... $1.70/10 ..... $15.60/100
#S10AK 1-1/8" .$1.50/10 ..... $12.00/100
#S4OAK 1-1/2" .$2.40/10 ..... $22.00/100

Birch Screw Hole Buttons

#1432 3/8"..... $1.76/100 ..... $7.50/500
#1434 1/2"..... $1.76/100 ..... $8.00/500

Oak Screw Hole Buttons

#1452 3/8"..... $3.70/100 ..... $15.50/500
#1454 1/2"..... $3.80/100 ..... $16.00/500

Birch Candle Cups

#7290 1" ..... $2.00/10 ..... $13.00/100
#CC1 1-1/2"..... $2.90/10 ..... $19.00/100
#7385 5/8" ..... $1.50/10 ..... $10.50/100
#8149 1" Bean Pot..... $2.00/10 ..... $13.00/100

2" Brass Eagles

#878 ..... $2.75/10

Quartz Clock Movement W/Hands

#Q82 1-4 ..... $5.50/EA
5-9..... $4.35/EA
10-24..... $3.95/EA
25+ $3.40/EA

Push-Thru Lamp Socket

#940 ..... $1.59/EA

Lazy Susan Bearings

#LC3 3" ..... $.95/EA
#LC4 4" $1.25/EA
#LC6 6" $2.25/EA
#12C 12" $5.99/EA

Clipboard Clips

#L5 3" ..... $.55/EA
#ST6 6" ..... $.75/EA

Magnetic Strip

#120A 1/2 in. x 120 inches $4.40/Roll

Paper Towel Roller

(spring loaded)
#7238 ..... $1.19/EA

Picture Hangers

#S23 1-7/8" $4.70/100

Mini Hanger

#7247 5/8"..... $2.60/100

Saw Tooth Hangers

#S59 1-5/8" $4.17/100
#S60 2-3/4" $4.50/100
#406 Self-Fastening Hangers $4.77/100

Prong Hanger

#7248 ..... $2.90/100

Solid Brass Cup Hooks

#812 1/2"..... $5.55/100
#858 5/8"..... $6.30/100
#834 3/4"..... $7.45/100

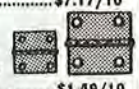
6" Brass & Porcelain Hooks

#6417 3 Prong. $5.85/EA
#6416 2 Prong. $2.97/EA

Black Hammer Hinge w/Screws

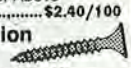
#1730 ..... $1.62/2 ..... $7.17/10

Brass Plated Hinges



#910 1"..... $1.49/10
#928 1-1/2"..... $2.39/10
Screws For Above
#F124 ..... $2.40/100

Production Screws



#6277 1-1/4" x #6 ..... $1.70/100
#6278 1-5/8" x #6 ..... $1.90/100
#6279 2" x #6..$2.50/100
#6282 3" x #8..$4.75/100

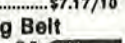
36" Birch Dowel

#7160 1/8" ..... $.70/5 ..... $2.50/25
#7161 3/16" ..... $.90/5 ..... $3.75/25
#7162 1/4" ..... $1.25/5 ..... $5.00/25
#7163 5/16" ..... $1.50/5 ..... $6.50/25
#7164 3/8" ..... $1.75/5 ..... $7.50/25
#7166 1/2" ..... $2.50/5 ..... $11.25/25
#7167 5/8" ..... $3.40/5 ..... $16.25/25
#7168 3/4" ..... $5.25/5 ..... $23.75/25

Ceramic Knob w/Black Screw

#1661 3/4" ..... $.69/EA $5.37/10
#1662 1" ..... $.79/EA $5.90/10
#1663 1-1/4" ..... $.89/EA $7.17/10

Sanding Belt Cleaner 8"



#1710 ..... $5.37/EA

WHAT'S A DOOR HARP?

Mounted on the inside of your door, a door harp will welcome your guests with a beautiful musical tune each time the door is opened. You'll find it easy to build these door harps in your shop using only standard 3/4" stock and our special Hardware Parts Kits.

Goose Door Harp Kit

Special Free Plan With This Kit Only

This kit contains all hardware and 1/8" plywood for building this loveable Goose Door Harp. Full Size plans. Project requires some 3/4" pine (not included). Kit is not precut, some sawing required. You get 8 tuning pins, music wire, 4 clapper balls, plastic eyes, 1/8" thick plywood for front and back, plus complete plans and instructions.
#7640 Goose Door Harp Kit $6.25/Kit

ANIMAL DOOR HARPS

DOOR HARP PLANS

You'll find our jumbo 22" X 34" blueprints very clear and easy to follow. Full step by step instructions explain every step. All drawings are FULL SIZE.
#W263 Raccoon Plan..... $3.50/EA
#W264 Panda Plan..... $3.50/EA
#W265 Owl Plan..... $3.50/EA
#W266 Frog Plan..... $3.50/EA
#W267 Hog Plan..... $3.50/EA
#W270 Package of all 5 door harp plans above..... $12.99/EA

HARDWARE PARTS KITS

These kits contain the hard to get parts - special high resonance plywood, tuning pins, clapper balls, music wire and plastic eyes. You need to supply some 3/4" stock, and the paint. Plan is not included with kit, order it above.
#7765 Raccoon HDW Kit $6.50/EA
#7770 Panda HDW Kit..... $6.50/EA
#7767 Owl HDW Kit..... $7.50/EA
#7768 Frog HDW Kit..... $6.50/EA
#7769 Hog HDW Kit..... $6.25/EA

Tuning Pin Wrench

#7445 Tuning Pin Wrench..... $9.95/EA

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TIPS FROM YOUR SHOP (AND OURS)

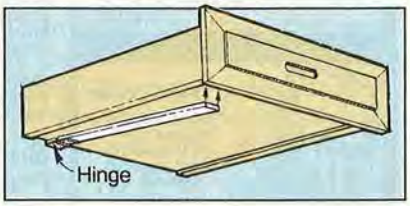
Continued from page 20

SECURING DRAWERS WITHOUT LOCKS

Young and inquisitive hands have an affinity for exploring drawers in gun cabinets and other off-limits areas. You could install a lock on each drawer, but that's expensive and may require keeping track of several keys.

TIP: Install a 1"-wide blocking stick on the bottom of the drawer so it drops into place behind the frame of the cabinet front. A finger hole bored through the dust panel (see drawing *below*) provides a way to release this latch and open the drawer from below. Only the bottom drawer in a series like this requires a lock.

—Asa M. Reece, Plantation, Fla.



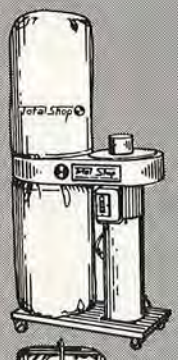
MORE HELPFUL TIPS

You'll find other shop tips scattered throughout this issue of *WOOD*® magazine. To help you find them, here's a listing:

- We've come across a terrific self-adhesive material that makes quick work of enlarging or reducing patterns, and transferring them to projects. See the article on stain-resist finishing, beginning on page 46.
- We'll show you how to "clamp" pie-shaped pieces together without the use of clamps. See the floor-lamp project on page 58.
- Do you know how to cut raised panels on a tablesaw? We show you how in the country project on page 76.
- Here's a way to pry apart two pieces of wood joined with double-faced tape, without marring them. See the recipe-card-box project on page 78.
- You can make your own paper decals. See page 82.

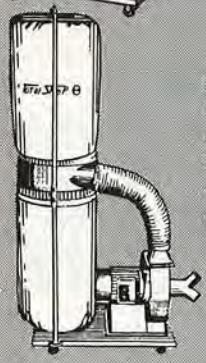
Total Shop®

More New Items for '89



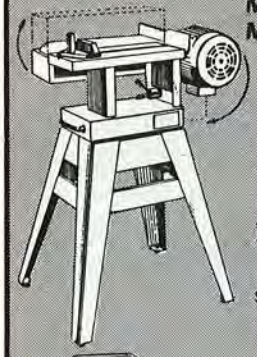
Dust Collector
- 1 hp, 110v
- 4" inlet
- Commercial quality
- Compact size

Reg. $348.00 **$209.00**
(Shp. & Hdlg. $30.00)



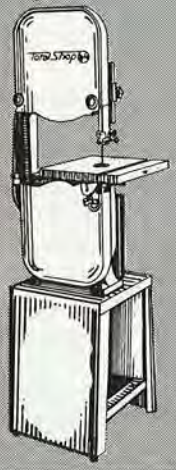
Industrial Dust Collector
- 2 hp, 110v
- Two 4" inlets
- 1185 CFM
- 125 lbs.

$499.00 Value **$339.00**
(ships freight collect)



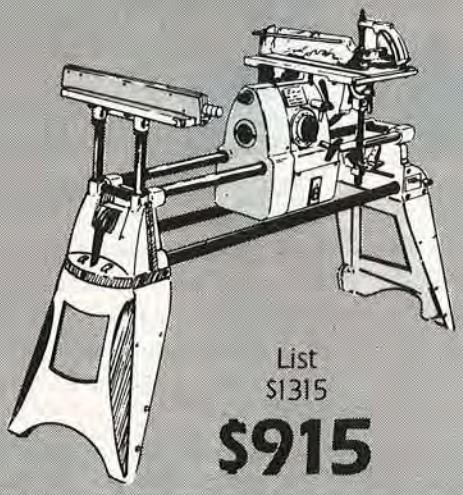
MS-648 Sanding Machine
- Table tilts 2 ways for horizontal or vertical sanding
- ¾ hp
- 6" x 48" Band
- 17¾" Table

Reg. $369.00 **$269.00**
(ships freight collect)



TS 14-56 14" Bandsaw
- Blade size up to ¾" wide
- Cast iron construction
- 180 lbs.
- ¾-hp

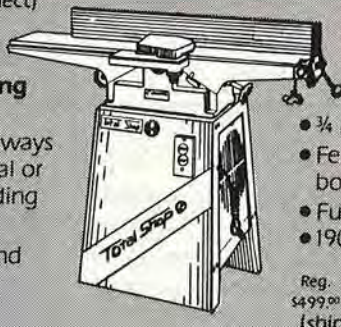
$259.00
(ships freight collect)



List $1315
$915

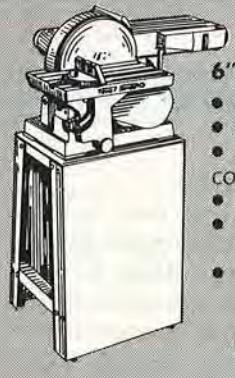
In less than a minute The Total Shop Multipurpose machine can be converted into any of five basic power tools necessary for any building project, yet it takes up less space in your shop than a couple of old trunks. The Total Shop multipurpose machine is strong, precise and versatile, not to mention priced so that owning your own woodworking shop is a real possibility and not a problem.

Call Toll Free ☎ **1-800-845-9356** or in S.C. 288-4174



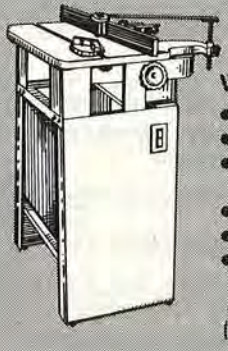
6" Long Bed Jointer
- ¾ hp, 110v
- Fence tilts 45° both ways.
- Fully adjustable
- 190 lbs.

Reg. $499.00 **$299.00**
(ships freight collect)



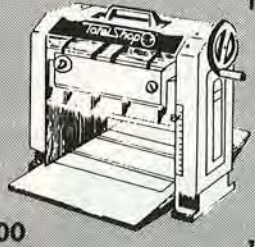
6" Belt Sander
- ¾ hp
- 6" x 48" belt
- Cast iron construction
- 152 lbs.
- 9" Sanding Disc Included
- Ball Bearings

$199.00
(ships freight collect)



Wood Shaper
- ½" Spindle
- 1 hp
- Cast iron construction
- Precision fence
- 160 lbs.
- Ball bearings

Reg. $499.00 **$239.00**
(ships freight collect)



12" Thickness Planer
- Depth of cut ⅛"
- Feed rate 26 fpm
- 69 lbs.
- Safety Switch
- All ball bearing

$395.00
(Shp. & Hdlg. $20.00)
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G1031 G1028/G1029 G1030

We have negotiated a multi-million dollar deal with the factory and are pleased to inform you of a huge promotional price-break on all the dust collectors we carry. This is a time-limited special and prices are subject to change without notice.

Grizzly IMPORTS, INC.

WE WILL NOT BE UNDERSOLD - PERIOD!

MODEL G1031: Mini Dust Collector, features 2 bags, ½ H.P. motor. Stands 58" high, intake hole is 4", base measures 15" x 26". Weighs 75 lbs. ONLY $189.95 PLUS $20.00 Shipping

MODEL G1028: Features 2 bags, 1 H.P., 12 amp. motor. Stands 76" high, 610 ft.³ min., base measures 20" x 35", one 4" intake hole. Weighs 185 lbs. ONLY $265.00 F.O.B. Bellingham, WA or Williamsport, PA

MODEL G1029: Features 2 bags, 2 H.P. motor that draws 10 amps at 110V and 20 amps at 220V, 1182 ft.³ min., base measures 20" x 35", two 4" intake holes. Weighs 210 lbs. ONLY $295.00 F.O.B. Bellingham, WA or Williamsport, PA

MODEL G1030: Features 4 bags, 3 H.P. single phase motor that draws 18 amps at 220V or 36 amps at 110V, 1883 ft.³ min., three 4" intake holes, base measures 21" x 46". Weighs 270 lbs. ONLY $410.00 F.O.B. Bellingham, WA or Williamsport, PA

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PRODUCTS THAT PERFORM

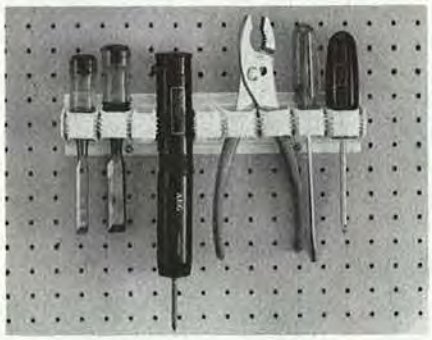
Print this article

A GRIPPING IDEA

The Super Klip Grip may be the best idea for shop organization since the peg board. Made by the Super Glue folks, the heavy-duty 8-loop model held everything I threw at it in the garage, from wrenches to fishing poles to screwdrivers, and would double as a hanger for most of your garden tools. The plastic clips won't mar tools, which can fit either between or inside the clips. Models come with 3, 8, 12, or 24 loops in brown or white. A 5-loop mini version will hold objects as small as glue brushes.

—Tested by Steve Oswalt, a Des Moines woodworker and frequent contributor to *WOOD*® magazine.

Super Klip Grip, suggested retail $2.49–6.49 at True Value hardware stores nationwide.



A POUNDING SUCCESS

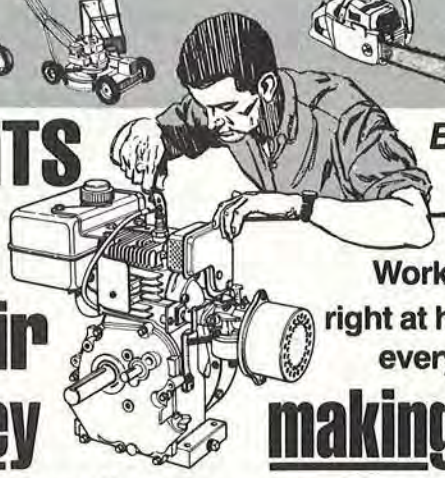
For a small investment, you'll protect your fingers and improve your dexterity in tight places with Sure Hit, a new nail-starting attachment. The device slid easily onto my hammer and held a wide variety of nails. To my surprise, Sure Hit let go of the nail and flipped out of the way, without fail, following every blow I made. I found it easy to hit the area intended for the nail, but I wouldn't recommend using the device for precise placement of nails. It's not something you'll need to drive every nail, but for overhead work and hard-to-reach places, Sure Hit is a sure smash.

—Steve Oswalt

Sure Hit, $2.95 ppd. from Lamar Hammer Inc., 3029 Fleetwood Ave., Baltimore, MD 21214.

Continued on page 26

Get in on the PROFITS in SMALL ENGINE service and repair



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Because the small engine industry has grown so quickly, an acute shortage of qualified Small Engine Professionals exists throughout the country. In fact, it's not unusual for a good small engine man to be three to four weeks behind in the summer and at least a week behind in the winter. When you see how many small engines are in use today, it's easy to understand why qualified men command such high prices — as much as $49.95 for a simple tune-up that takes less than an hour!

65-million small engines are in service today!

That's right — there are over sixty-five million 2-cycle and 4-cycle small engines in service across the U.S.A. That's the official count from the Engine Service Assn., and new engines are being built at a rate of one-million per month! With fully accredited and approved Foley-Belsaw training, you can soon have the skill and knowledge to make top money servicing these engines. Homeowners and businessmen will seek you out and pay you well to service and repair their lawnmowers, tillers, edgers, power rakes, garden tractors, chain saws, mini-bikes, go-carts, snowmobiles, generators, snowblowers, paint sprayers... the list is almost endless.

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You don't need to be a 'born mechanic' or have prior experience. If you can read, you can master this profitable trade right at home, in your sparetime, without missing a single paycheck. Lessons are fully illustrated—so clear you can't go wrong.

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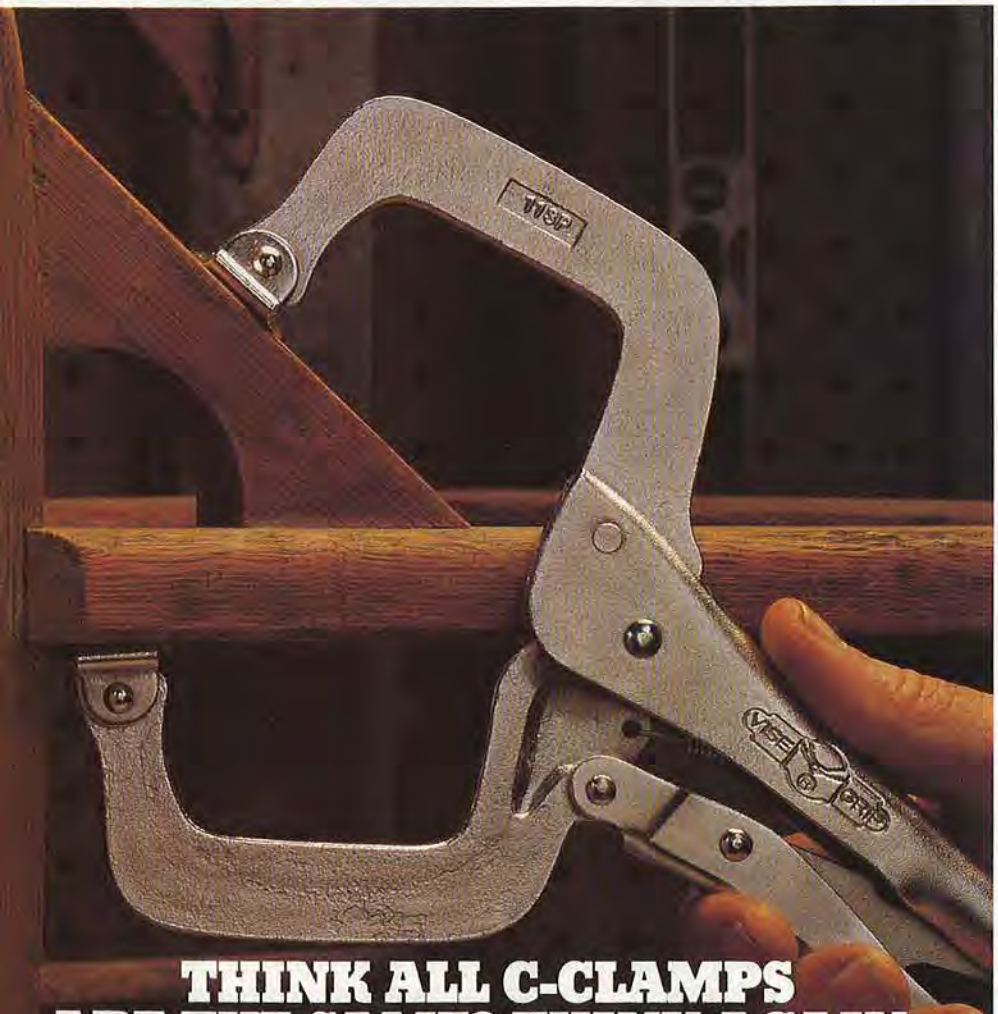

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PRODUCTS THAT PERFORM

Continued from page 24

CROWN GIVES ROYAL FLUSH TO BOARDS

With standard bar or pipe clamps, getting a flush alignment across the surface of edge-glued boards can be a tricky and frustrating business. Shopsmith's double bar clamps make quick, easy work of this job while giving a flush surface. The result: You save hours of sanding later. The secret of these clamps lies in the crown on the facing inside edges of the wooden beams. When you tighten the clamp, its crown assures that inside and outside boards receive equal pressure.

The lightweight clamps slip easily into position and a few turns of the clamps' wing nuts simultaneously apply pressure to the sides, top, and bottom of the boards. Although the clamps are coated to prevent the inevitable glue squeeze-out from sticking to them, I placed waxed paper between the clamps and stock to keep the bars glue-free.

I found the maximum spacing of the clamps to be 24", so a set of clamps can represent a major investment. But if you glue-up a lot of boards for width, these clamps will pay much-appreciated dividends in time saved sanding.

—Tested by Jim Boelling, *WOOD*® magazine's Project Builder

Shopsmith double bar clamps, available in 24" ($32 each), 36" ($36), and 48" ($39) lengths (prices do not include postage or state sales tax) from Shopsmith, 3931 Image Drive, Dayton, OH 45414. Call 800-762-7555 for more information.

Continued on page 28

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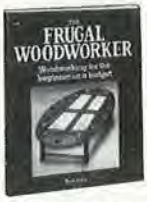

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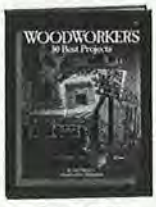

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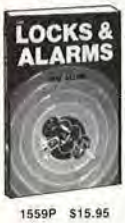

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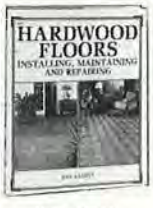

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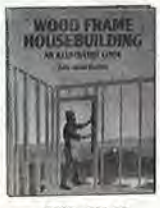

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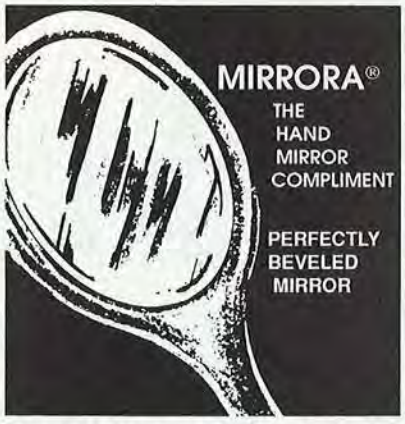

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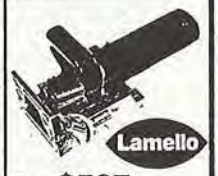

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PRODUCTS THAT PERFORM

Continued from page 26

HTC MAKES LIFE EASIER

"Why don't all wheels roll this easily?" Jim Boelling, *WOOD* magazine's Project Builder, asked as we took our first HTC mobile base unit for a test drive in our shop. "These roll great!"

Since we put our bandsaw and tablesaw on HTC bases one year ago, we haven't been disappointed. We constantly roll woodworking equipment in and out of the shop, across uneven floors, and over threshholds. The HTC bases stand up to the work.

Unlike some mobile bases with four wheels, the three-wheel HTC system compensates for uneven floors—our machines don't wobble wherever we put them. The HTC units have two additional pluses for stationary power tools: The bases elevate the machine only ¾", and the braking knobs perform a solid job locking wheels when it's time to work.

—Tested by Carl Voss, *WOOD*® magazine's Managing Editor

HTC manufactures mobile base units for more than 400 standard models of stationary power tools. HTC also will make a base to your design specifications. The bases sell for between $68 and $300 (most common models about $100). Write to: HTC Products, Inc., 120 E. Hudson, Royal Oak, MI 48067.

Continued on page 30

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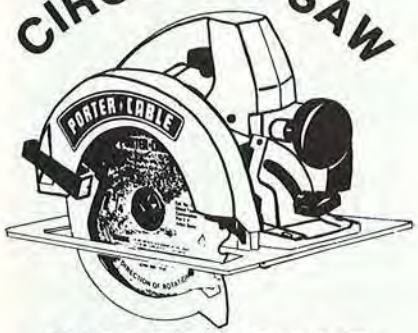

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PRODUCTS THAT PERFORM

Continued from page 28

A NEW KIND OF TAPE RECORDER

The incredibly simple MezurMark-Too makes so much practical sense that I have to wonder why it's not standard on every tape measure. You attach it to the side of your tape case, ever handy to record a measurement. Pencil, ballpoint, and felt-tip pens all write well on the slate. A thumb wipe or rag removes pencil marks and, with a little moisture, clears away ink.

The MezurMarkToo comes in one size—2½ × 2¾"—so you may have to cut it to fit your tape measure. It tends to crack as you cut it with tin snips, so cut it a little large and sand it down to size. A scrollsaw also works well.

—Steve Oswalt

MezurMarkToo, $2 ppd., from Downey Services, PO Box 1277, Oak View, CA 93022. Call 805/649-1364.

ONE-HANDED VISE

Only your imagination and the thickness of your stock limits the number of uses you'll find for Multi-Stop, a well-machined, easy-to-handle attachment for fences and miter gauges. The jaws on this mini-vise open to about 2" and have a comfortable heft. With only the flip of a locking arm, the unit didn't slip on any application I tried. The accompanying instructions show nine uses involving six power tools—radial arm, table, and band saws, a drill press, shaper, and router.

—Steve Oswalt

Multi-stop work positioner (cat. No. 12D32), $29.95 ppd. from Woodcraft Supply Corp., 41 Atlantic Ave. Box 4000, Woburn, MA 01888. Call 800-225-1153.

THREE-IN-ONE TAPE

The Mark-O-Matic tape measure doubles as a pencil and moonlights as a compass. Straight-edge measures take a little practice; to avoid a crescent-shaped marking line, I slid the tips of the tape along as I marked. Front and back pencil leads allow a variety of measuring techniques, including a nifty one for transferring the length of an enclosed alcove onto a work piece. Inserting a pin into a hole in the tape makes it a compass. Extra leads and two pins store in a covered pocket.

—Steve Oswalt

Mark-O-Matic (cat. No. 1081510), $14.99 ppd. from Fine Tool Shops, Box 7091, 170 West Road, Portsmouth, NH 03801. Call 800-533-5305, 9 a.m.–4 p.m. EST.

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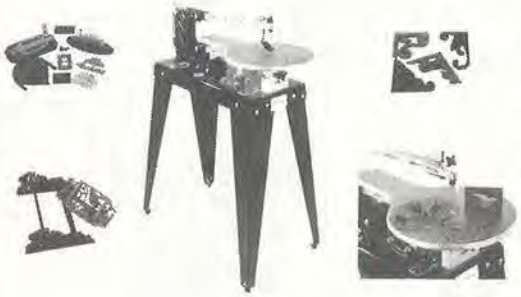

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America's largest line of Precision Scroll Saws can unlock your creativity. With **6 models to choose from**, there is one suited for <u>your needs</u>. It takes a real woodworker to build a first class tool and that's what RBI is all about. We're American Woodworkers building quality, affordable tools with pride for you - the American Woodworker. Send today for your free information kit to see why rbi is the best value for your woodworking dollars.

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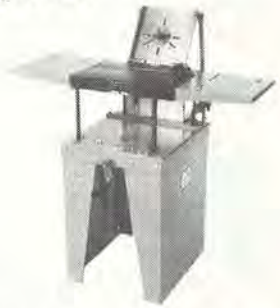
Create beautiful wood joints so precise, you may be tempted not to glue them! **Making finger joints, mortise and tenons, all types of dovetail joints, mitered joints, and raised panel doors has never been easier.** Your rbi Joint Machine can also convert into a spindle shaper or an inverted pin router with accessory attachments. Send for your free fact kit today!



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AFPC adjustable fence for 555 **59.95**

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9850 Porter-Cable's New 12V cordless Drill Kit With Metal Case, Charger, Battery and insert bit.

NEW!

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9345 Saw Boss Kit With metal Case, Plywood Blade and Combo Blade.

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TR12 3 HP Plunge Router with $60.00 Accessory Package.

You get:

- ★ Straight guide
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1581 VSK Top-handle jig saw kit with metal case **$159**

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With Free 3M Stik-It Pad!

B04510SP Makita's Industrial Pad sander with both Felt and 3M Stik-It Pad.

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Same As Above Except 3 H.P., 4 Bags and 1883 CFM. $695

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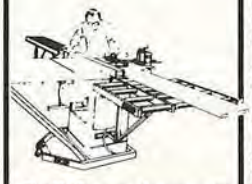

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Phone for prices in Powermatic

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Table Saw Lubricant
Dry Lubricant prevents rust and makes wood glide. Keeps router bits sharper too. **$10.95**

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Both Sets Come With FREE Door making book!

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FB-107 7pc Forstner bit set **$49**
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FINE CUT-OFF CROSS CUT BLADES	
LU73M008 8"X48T ATB	$54
LU73M009 9"X54T ATB	59
LU73M010 10"X60T ATB	39
LU73M012 12"X72T ATB	85
PRECISION PLYWOOD BLADES	
LU82M008 8"X48T TCG	59
LU82M009 9"X54T TCG	64
LU82M010 10"X60T	59
LU82M012 12"X72T TCG	92
COMBINATION BLADES	
LU84M008 8"X40T COMB.	53
LU84M009 9"X40T COMB.	53
LU84M011 10"X50T COMB.	38
LU84MO12 12"X60T COMB.	69
RIPPING BLADES	
LM72M008 8"X24T FLAT TOP	43
LM72M010 10"X24T FLAT TOP	36
LM72M012 12"X30T FLAT TOP	65
SUPER FINE CUT-OFF BLADES TEFLON COATED	
LU85M008 8"X64T ATB	$69
LU85M009 9"X72T ATB	75
LU85M010 10"X80T ATB	59
LU85M012 12"X96T ATB	99
LU85M014 14"X108T ATB	119
LU85M015 15"X108T ATB	149
ATB = Alternate Top Bevel TCG = Triple Chip Grind	
SC-001 Saw Blade Stabilizer	17
CARBIDE DADO SETS	
DS306 6" Dado	$99
DS308 8" Dado	109
AD800 8" Adjustable Dado	49
JS-100 Joining Machine	169
0-10-20 Bisquits box of 1000	29

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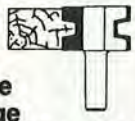
All Bits ½" Shank and are Carbide Tipped

Finger Joint Bit 99-037 $89

Door Pull Bit 99-007 $59

Lock Miter Bit 99-034 $79

½ & ¼ Corner Round Bit 99-044 $59



Wedge Tounge Bit 99-032 $59

Wedge Groove Bit 99-033 $59

Drawer Joint Bit 99-240 $59

Multi-Form Bit 99-PK1 $79

35MM European Hinge Bit 3557R $29

WC-106 6pc Chisel Set **$39**
WC-110 10pc Chisel Set **$59**

CONTEST INFORMATION

PRIZES		
Divisions	Toys with Movable Parts	Toys Without Movable Parts
Grand Prizes: $1,500 in merchandise		
Student (K-12) Home Hobbyist Professional	Total Shop Foley Belsaw AMI/Hegner	Black & Decker Delta Freud
First Prizes: $250 in merchandise		
Student (K-12) Home Hobbyist Professional	Hitachi Makita Garrett Wade	Grizzly Skil Bosch
Special Citations: $100 in merchandise (Five awards in each category)		
Student (K-12)	Formby's	DML
Home Hobbyist	Popular Science Book Club	Dremel
Professional	Woodmaster Tools	Minwax

All nonwinners eligible for drawing:
- $1,400 Shopsmith Mark V 500 system
- $1,000 in Porter-Cable merchandise
- $500 in Ryobi merchandise
- $250 in AEG merchandise
- 3 Ripstrates from Fisher-Hill Products ($50 each)

RULES

1. Toys must be your original design. A different approach to an existing toy would qualify. Please, do not not enter toys with only subtle changes from published patterns.
2. Make projects no larger than 24x24x24". The primary material should be wood, but may incorporate other materials.
3. Please follow Consumer Product Safety Commission guidelines:
- Nontoxic woods and wood finishes only;
- No parts smaller than 1¼" square on toys for children under 3 years of age. No sharp corners or points;
- Pull strings longer than 12" should not have beads or other attachments that could tangle and form a loop.

4. No purchase necessary. Complete an entry form, photocopy an entry form, or print Design-A-Toy at the top of a 3×5" card with your name, address, daytime phone number, and experience division. Mail with entry to: Design-A-Toy™, *WOOD*® Magazine, 17th at Locust, Des Moines, IA 50336.
5. Entries must be received by February 1, 1989. All entries must be postpaid; collect entries will be refused. Attach an official entry label to each toy. Enter as many times as you wish.
6. Entry constitutes permission to use winner's name and photograph for promotional purposes. Employees and family members of Meredith Corporation, their affiliates and subsidiaries are ineligible.
7. All federal state, provincial, and local laws apply. Void where prohibited. Contest and Nonwinners Drawing void in Quebec. Canadian winners must correctly answer a skill-testing question, as required by law, to become an official winner.
8. Contest winners will be judged by a panel comprised of representatives from the U.S. Marine Corps Reserve, Meredith Corporation, and woodworking and toys experts, whose decision is final. Meredith Corporation will donate all entries to the U.S. Marine Corps Reserve Toys for Tots program.
9. All nonwinners in the contest are eligible for a random Nonwinners Drawing. Meredith Corporation, whose decision is final, will supervise the Nonwinners Drawing. Chances of winning depend upon the number of entries received.
10. Winners will be selected and notified by mail no later than August 20, 1989. For a list of contest and drawings winners, send a separate, self-addressed stamped envelope to Design-A-Toy,

Continued on page 90

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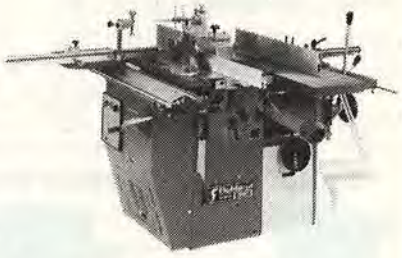

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SY-1212-3 1/2" $28.95	SY-1212-6 1-1/2" $36.95
	SY-1212-8 2" $59.95

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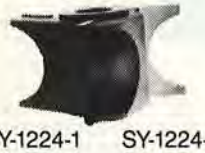
SY-1223-1 1/4" $24.95	SY-1223-4 3/4" $32.95
SY-1223-2 3/8" $26.95	SY-1223-5 1" $35.95
SY-1223-3 1/2" $28.95	

Bead



SY-1224-1 1/4" $24.95	SY-1224-4 3/4" $32.95
SY-1224-2 3/8" $26.95	SY-1224-5 1" $35.95
SY-1224-3 1/2" $28.95	

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SY-1225-3 1/2"R $28.95	SY-1225-6 1¼"R $49.95

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806	9/16	$8
810	3/4	$9
* 810-1/2	3/4	$9
* 812-1/2	1	$12

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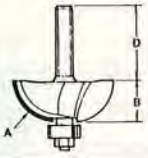
PART NO.	A	PRICE
S8012Y	3/8	$7
S8016Y	1/2	$8
* S8016Y½	1/2	$8
S8020	5/8	$10
* S8020½	5/8	$10

Cove Bits



PART NO.	A	PRICE
S702Y	1/16	$12
S704Y	1/8	$12
S706Y	3/16	$12
S708Y	1/4	$13
S710Y	5/16	$13
S712Y	3/8	$13
S716Y	1/2	$14
* S716Y-1/2	1/2	$14
* S724Y-1/2	3/4	$28

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2-5/8" O.D. Panel Raisers in the 5 profiles above – **$29.95** each. NEW!

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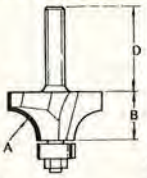
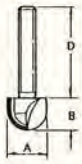
Roundover



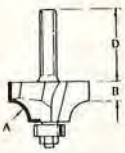
PART NO.	A	PRICE
S502Y	1/16R	$11
S504Y	1/8R	$11
S506Y	3/16R	$11
S508Y	1/4R	$11
S510Y	5/16R	$12
S512Y	3/8R	$14
S516Y	1/2R	$16
* S516Y-1/2	1/2R	$16
* S520Y-1/2	5/8R	$20
* S524Y-1/2	3/4R	$20
* S528Y-1/2	7/8R	$34
* S532Y-1/2	1R	$34
* S536Y-1/2	1-1/4R	$40

Core Box



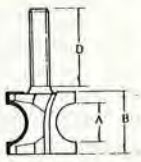
PART NO.	A	PRICE
S408	1/4	$10
S412	3/8	$10
S416	1/2	$12
S420	5/8	$14
S424	3/4	$15
* S424-1/2	3/4	$15
* S432-1/2	1	$18
* S450-1/2	1-1/2	$30

Beading



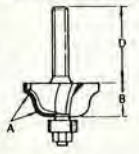
PART NO.	A	PRICE
S602Y	1/16R	$11
S604Y	1/8R	$11
S606Y	3/16R	$11
S608Y	1/4R	$12
S610Y	5/16R	$13
S612Y	3/8R	$15
S616Y	1/2R	$16
* S616Y-1/2	1/2R	$16
* S624-1/2	3/4R	$20

Bull Nose



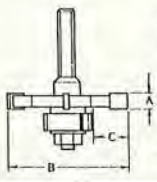
PART NO.	A	PRICE
SY9-1	1/4	$14
* SY9-1½	1/4	$14
SY9-3	3/8	$15
* SY9-3½	3/8	$15
SY9-4	1/2	$15
* SY9-4½	1/2	$15
SY9-5	5/8	$16
* SY9-5½	5/8	$16
SY9-6	3/4	$16
* SY9-6½	3/4	$16
* SY9-8½	1	$18
* SY9-9½	1-1/8	$30
* SY9-10½	1-1/4	$35
* SY9-11½	1-3/8	$38
* SY9-12½	1-1/2	$40

Roman Ogee



PART NO.	A	PRICE
S5705Y	5/32	$16
* S5705Y½	5/32	$16
S5708Y	1/4	$17
* S5708Y½	1/4	$17

Slot Cutter - 4 Flutes



PART NO.	A	PRICE
SY7002	1/8	$24
* SY7002½	1/8	$24
SY7004	5/32 (4mm)	$24
SY7004½	5/32 (4mm)	$24
SY7006	3/16	$24
* SY7006½	3/16	$24
SY7008	1/4	$24
* SY7008½	1/4	$24

*Indicates ½" shank.

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FEBRUARY WOOD® 1989
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KOA

Hawaii's hardwood soldier of the sea

Had the 18th-century explorer Captain James Cook been a woodworker with an eye for fine stock, he would have shaken his head in disbelief on his first Hawaiian landing. For in that Pacific paradise, natives had for centuries depended on huge outrigger canoes made from hollowed-out logs of a brightly hued hardwood. In them, they traveled hundreds of miles from island to island for war or trade. In fact, the early Hawaiians honored their canoe wood for its seaworthiness by naming it *koa-ka*, meaning "valiant soldier."

The English shortened the native word to koa. And, they no doubt quickly discovered that the beautiful wood had potential for more than dugout canoes.

By the late 1800s, items of koa appeared in U.S. ports, brought by returning missionaries. Attracted by the color and figure of the new wood, furnituremakers, architects, and coachbuilders demanded logs. Nowhere, though, did anyone sing the gorgeous wood's praises louder than in Hawaii. There, craftsmen made koa ukuleles, an instrument introduced by Portuguese sailors.

Fiddleback koa

Plain-sawed koa

Wood identification

Koa (*Acacia koa*) grows in quantity only in the Hawaiian islands. There, it grows everywhere—from the beaches to the volcanic peaks. Koa trees in Hawaii show no preference for a particular soil type or climate.

Mature koa trees reach 120′ heights and 8′ diameters. In stands, their trunks can be free of branches for 80′. Open-grown koa trees, however, nearly imitate live oak trees with numerous spreading branches that form wide, open crowns.

Koa's bark appears gray colored, flaky, and fissured. Branches display clusters of small, light-green, pointed leaves.

At about 50 pounds per cubic foot, air-dry, koa weighs about 25 percent more than black walnut. Koa, like walnut, has high crush resistance and shock absorbance. Unlike walnut, however, koa's grain interlocks, opening the door for exceptional fiddleback figure.

Koa's thin, light-colored sapwood surrounds a heartwood that some woodworkers describe as lustrous, swirled marble. Primarily reddish brown to dark brown, the wood occasionally carries colorful tones of gold, black, and deep purple.

Working properties

Due to koa's interlocking grain, you'll find that it has a greater bending strength and stiffness than walnut. It works quite easily with both hand and power tools, except that it may burn when routed or sawed cross-grain. So, keep cutting edges sharp and avoid a slow feed rate. Plane curly or fiddleback koa at a slight angle to avoid tearing the grain.

You'll have best success joining koa with screws as well as glue, since occasional resin pockets sometimes prevent solid adhesion with glue alone. These same resins, however, make the wood resistant to insects and fungus. And, you can sand koa to a silky finish.

Uses in woodworking

Koa ranks as a cabinet wood of exceptional beauty and quality. You can work it into fine furniture, sculpture, turnings, and musical instruments. Because of its shock resistance, it makes exceptional gunstocks. Due to its decay resistance, koa also performs well as boat trim. As veneer, especially with fiddleback figure, koa becomes costly architecture paneling.

Cost and availability

In the early seventies, koa was readily available in the mainland U.S. Then, it practically disappeared in the marketplace because Hawaii's main koa mill ceased operation. Now, through the efforts of smaller mills in the islands, you can buy the wood once again—at a premium price of about $5 per board foot. Plain-sliced, nonfigured veneer costs about $1.50 per foot—double for figured.

Illustration: Steve Schindler
Photos: Jim Kascoutas

STEP RELIEF

If you've ever admired a beautiful relief carving, but thought you weren't artistic enough to try it, think again! Even those of us with little or no eye for proportion or sculpture can be successful . . . once we know a few of the rules. Here's your chance to get the basic instruction that will allow you to dive right in and come up a winner.

A CARVER BY ANY OTHER NAME

Jim Rose didn't know anything about carving when he and his wife, Pam, spotted some relief carvings at a theme park. When Pam wanted to buy a caricature of an Ozark Mountain man, Jim responded like so many of us by saying "I can do that." The scene happened 20 years ago, and Jim's been carving away ever since, winning awards and the respect of fellow carvers.

While many of us at *WOOD®* magazine dabble in carving, we turned to this resident of Ankeny, Iowa, for some expert advice. Jim was happy to help us, with one regret: "I wish this article had been written when I was starting out—I had to learn the hard way, by myself."

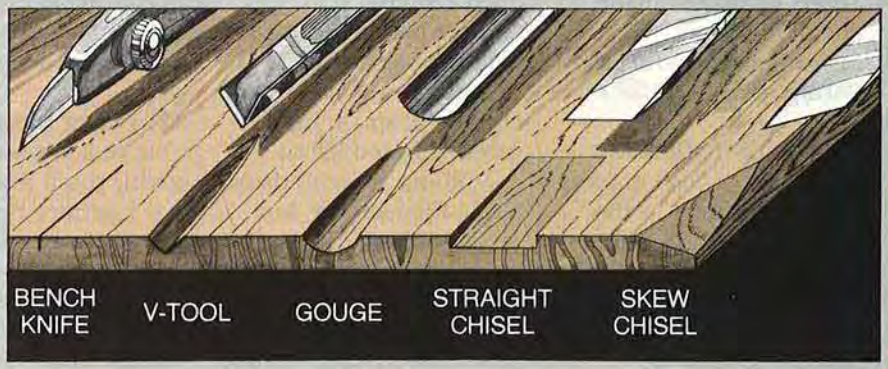
IT'S REALLY PRETTY EASY ONCE YOU

THE "BIG 5" TOOLS: ALL YOU NEED TO START

Some relief carvers carry around suitcases full of carving tools, but you can make 90 percent of all the cuts you'll ever need with five basic tools. So, we suggest you postpone the purchase of more elaborate tools until the need arises. We also recommend that you buy presharpened tools that only need an occasional stropping to stay sharp. To learn how to use a strop, see the short article on page 70.

Here's a list of the five tools shown *below*, and what each will do for you. Refer to the glossary *opposite* for unfamiliar terms. See the Buying Guide on page 39 if you'd like to purchase this set.

- **Bench knife**—We like the Stanley Slimknife because of its retractable blade that's thin yet sturdy. Use the knife for making stop cuts and for cleaning up loose shavings. You can use an X-acto knife in its place, but we had our best results with the Stanley model.
- **⅜" #12 V-tool**—A great little tool for making outlining cuts and textured lines such as hair or veins.
- **⅜" #5 Gouge**—This tool makes fast work of wasting a lot of stock, removing wood up to a stop cut, and for texturing shapes such as a wave background.
- **⅜" #1 Straight chisel**—You'll find yourself reaching for a straight chisel when you need to flatten or round over a surface, or to remove coarse tool marks.
- **⅜" #1 Skew chisel**—Primarily used for rounding over edges, you'll also use the fine point of a skew chisel to remove material from tight areas.



Print this article

BY • STEP CARVING

Unlike other types of carving, such as whittling, that leave few pattern marks to guide you, the lines of a relief carving design never really disappear. Here's why. By the time you cut them away, you've nearly completed the design, and those marks have led you to almost certain success. Sound easy? It is!

When trying to teach carving basics, carving instructors have found that there's no better way to learn than by doing. So we've decided to follow this advice and start you out with a little background information about the necessary tools and methods. Then, starting on page 39 we take you step-by-step through a wall plaque project that uses a grape cluster as its theme.

LEARN THE BASICS

IN CARVING, IT HELPS TO KNOW THE LANGUAGE

Relief carvers have a vocabulary all their own, so we couldn't resist including some of the most-often-used words in this article:

Bench hook—This simple device secures a workpiece in place while you carve. We show you how to make one on page 38.

Outlining cut—The first cut you'll make (see step 2 on page 39), it forms a groove around the design, separating the raised portion of the pattern from the background.

Stop cut—Usually made with a straight downward plunge of a knife, this cut forms a vertical gap that *stops* a second cut made at a horizontal angle. Step 6 on page 40 shows a stop cut.

Strop—A strip of leather treated with a buffing compound used for sharpening blades.

Under cut—To help the 3-dimensional quality of a relief carving, these cuts remove stock from underneath the outside edges of the design, just as we do in steps 15 and 16 on page 41.

Wasting—Refers to the removal of a large amount of stock, usually in taking out the background material around a design with a gouge (see step 10 on page 41).

GET A GOOD GRIP

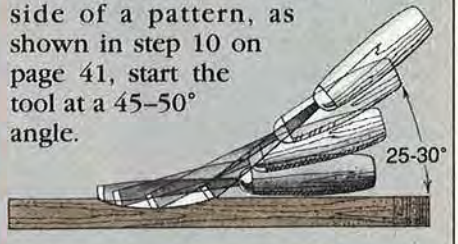
You'll carve safer and more effectively if you hold the tools correctly. For an ideal grip on chisels, gouges, and V-tools, hold them as shown on page 39, with the butt end of the handle firmly planted in your palm. For maximum accuracy, guide the tool with the index and middle fingers of your free hand. Hold your knife much like you would a pencil, as shown *below*.

"I can tell if someone's a beginning carver because their fingertips and knuckles turn white when they hold the tool," Jim Rose told us. "They should be pushing the tool with their arm and shoulder, not their fingers."

Placing your index finger on the top of knife allows you to put downward pressure on the blade.

THE CARVING MOTION: LIKE SCOOPING ICE CREAM

For safe, controlled, and accurate cuts, use the basic motion shown *below*, to remove wood. Push the tool into the project at a 25–30° angle, then lower your wrist as you make the cut, with the tool nearly parallel to the wood surface as the blade lifts out of the wood. For fast wasting around the outside of a pattern, as shown in step 10 on page 41, start the tool at a 45–50° angle.



KEEP YOUR BLADES SHARP

Nothing will frustrate you more quickly than dull tools. That's why experienced carvers constantly resharpen their tools for quality cuts. Because it takes more force to push a dull tool through wood than a sharp one, dull edges can also lead to injury. Why? By exerting unnecessary force, you will lose any finesse or control over your carving tools, and increase your chances of slipping. The carving instrument may cut into the wrong area of the carving, or worse yet, into you!

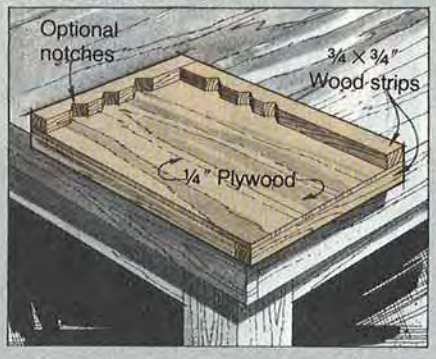
Continued

MORE RELIEF-CARVING BASICS

TRY THIS HANDY, EASY-TO-BUILD BENCH HOOK

Carvers use a variety of means to secure their workpieces, but we like the convenience of a bench hook like the one shown *right*. By placing your carving on top of the plywood portion, you can carve in several directions before turning your workpiece around.

To build it, cut a piece of ¼" plywood to at least the dimensions of your workpiece. Then, glue ¾×¾" wood strips along opposite corners on the top and bottom sides of the plywood. With a little more effort, you can add some notches, as shown in the illustration, allowing you to secure your carving in a greater number of directions.



PLAY IT SAFE

You can minimize your chances of injury by following three rules: First, always push the carving tool away from you. If you're tempted to turn a blade toward yourself as you carve, instead take the time to reposition the carving. Second, keep both of your hands behind the cutting edge as you push it. Finally, take a good look at your tools before you pick them up. More than one carver has been cut by blindly reaching out for a tool, only to slice a finger by grabbing it by the blade.

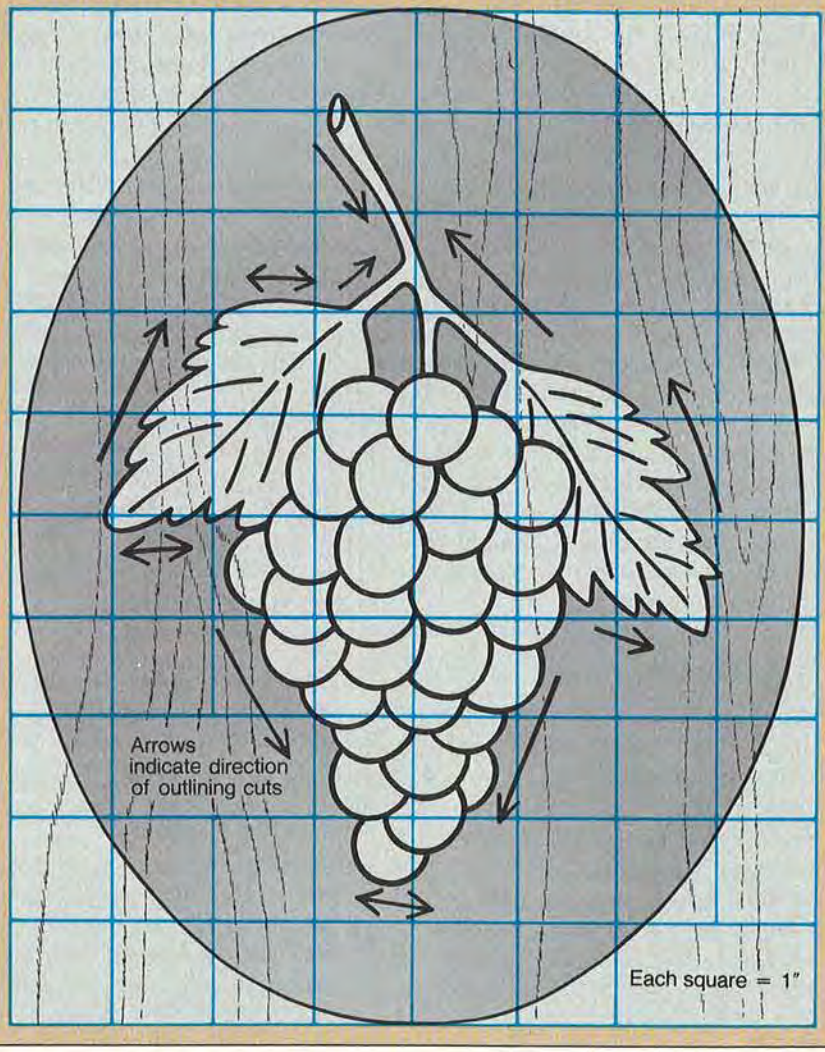
HOW TO CARVE IN RELIEF, PHOTO-BY-PHOTO

Through the centuries, grape and leaf carvings have decorated everything from wine casks to furniture. The version at *left* makes an ideal project for beginners because of its simple curves and classic beauty. In the process of making it, you'll learn many of the basic techniques of relief carving. To get started, you'll need the five carving tools and the bench hook described on pages 36–37 along with a pattern, and a strop.

Jim Downing, our design editor, asked his son Jamie—whose only carving work consisted of his initials in a backyard tree—to read an advance copy of this article. Jamie, 19, completed the project in 8 hours with results that pleased father and son. Our little test convinced us that you'll have equally satisfying results.

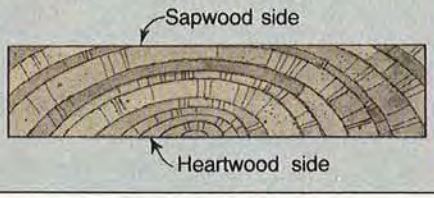
YOUR FIRST STEPS: LOWER THE BACKGROUND

It's a relief carver's rule of thumb to "waste," or remove, the deepest portions of the design first. So we'll lower the background (everything outside the grape cluster) to ⅜"—the maximum depth for low-relief carvings. We show you how, starting with step 1 on the opposite page.



CARVE ON THE SAPWOOD SIDE

Before you trace a pattern onto a workpiece, examine the end grain. Since wood has a tendency to cup toward the heartwood, and toward its carved side, you can counteract these two forces and reduce the likelihood of the piece warping by carving on its sapwood side.



DON'T CARVE TOO DEEP

Before you ever make your first cut, decide the maximum depth of the piece, and what areas you'll cut to that depth. Then, be careful not to cut any deeper—you'll find it practically impossible to disguise a cut that's too deep.

"It's a common myth that you need to carve deep, but good carvings achieve the illusion of depth while only going ⅜" or so deep," Jim said. "Look at any coin—there's an example of a very shallow relief carving that nevertheless has a good sense of depth."

BUYING GUIDE:

Set of 6 carving tools. This basic set contains the tools you'll need (plus two other gouges) for the project *below* including a ¼" #9 gouge, ¼" #8 gouge, ⅜" #1 skew, ⅜" #5 gouge, ⅜" #1 chisel, and ¼" V-tool, item No. 18A20, $35.50 ppd., from Woodcraft Supply, 41 Atlantic Ave. Box 4000, Dept. WBH19B, Woburn, MA 01888.

Stanley Slimknife. Available nationwide in many department stores, including K-Marts, and larger hardware stores.

1 Carving tools tend to follow grain direction, so if you're not careful, they can accidentally wander into your pattern. To keep this from happening, transfer arrows around the outside of the pattern as a reminder of the direction of your outlining cuts. As shown at *left,* the arrows point in directions that will take your tools *away* from the pattern as they're pushed. Two-sided arrows indicate you can carve in either direction.

2 Use a V-tool, layed on its point, to make a ⅛"-deep groove around the perimeter of your pattern, staying about ¼" outside the pattern lines. Notice the comfortable, sitting position of the carver. Keep your strop nearby and place your chisels on a rag to protect their sharpened edges.

3 With a gouge, widen the groove to at least ½", still staying away from the pattern.

4 Now, lay the V-tool on its side and cut away stock *up to*, but not over, the outside pattern line. Skip the pockets along the leaves and grapes that are too tight to work into, and save those areas for later.

Continued

5 Remove material from tight areas along the outside of the grape cluster by first making a cross-grain stop cut with the V-tool on its side, ending the cut just short of the pattern line. Then, use the same tool and motion to remove the excess material by coming up to the first cut from the other side of the corner as shown *below*. You won't be able to remove the wood inside the serrated areas along the leaves, so save those for later. Now, repeat steps 3–5 until you've lowered the outline cut the full ⅜".

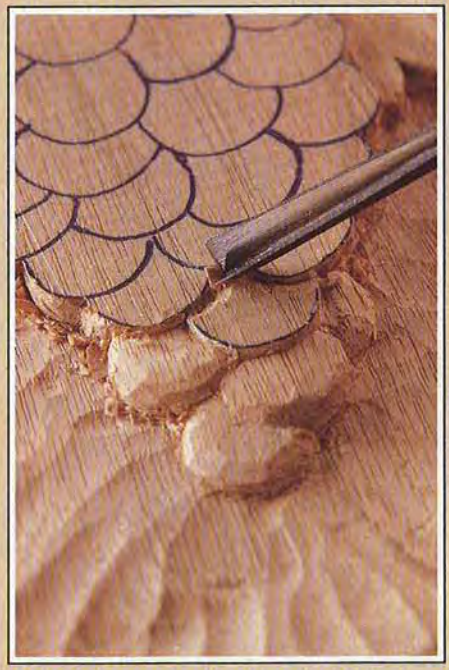
6 To remove stock from between the leaf serrations, first make stop cuts about ⅛" deep along both sides of the area. Start by plunging a knife into the tightest part of the corner, and pull the knife toward the outside of the pattern. To avoid breaking off leaf tips make the cross-grain cut first. Take your time, but if you accidentally break a leaf tip, don't worry—just modify the outside of the leaf. Your carving will look no worse for it.

7 Remove the material between the two stop cuts by cutting into the tightest part of the corner with a skew chisel as shown *below*. Now, lift the waste wood out, and repeat this process while working toward the outside of the excess wood. Repeat steps 6–7 until this area is flush with the surface along the outside of the pattern.

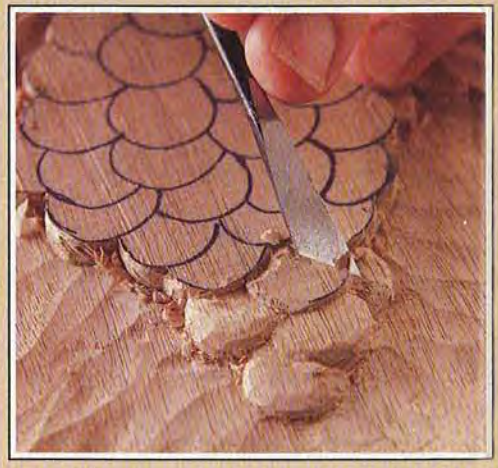
11 To shape the leaves, first define the edge between the grapes and leaves with a V-tool, just as you created the outline of the grapes against the background in steps 2–5. This time, however, carve to a depth of only ⅛".

Then, use a straight chisel as shown *above*, to lower the leaves and give them a wavy appearance. We shaped one leaf so it sloped up to its middle from both sides, and the other so it sloped up in one direction from the grape side.

After completing the leaves, lower the stem about ⅛" and round it over with the straight chisel. Finally, cut the tip of the stem at an angle (see photo of finished piece on page 38) to make it appear clipped off by a grape picker.

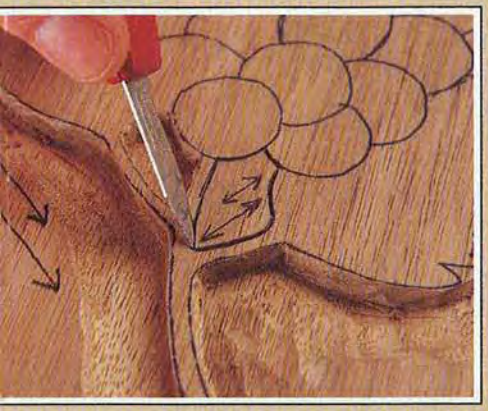


12 Since grapes at the bottom of the cluster appear farthest from the eye perspectively, carve the bottom grapes first. Carve one grape at a time and work your way up the cluster. Outline the edge of each individual grape with a V-tool as shown *above*.

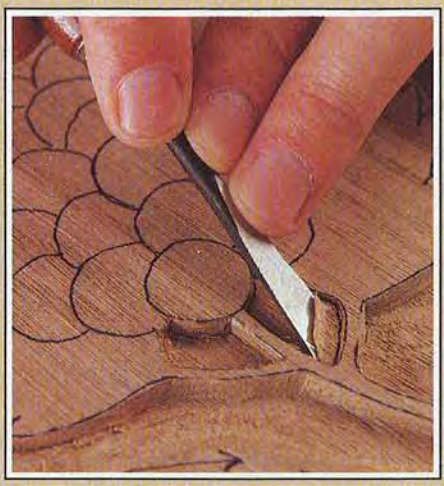


13 Next, round over the edges of the grapes with a skew chisel. Notice that we've lowered the level of the bottom-most grapes to enhance the design's sense of depth. As you work your way up the cluster, shape the grapes along the outside of the pattern first, making them just above the background and lower than the ones alongside them. You can achieve the illusion of globe-shaped grapes by rounding the edges of each grape and slanting its top surface downward into the grape above it.

8 Next, remove the background material between the stems to a depth of ⅜". As you did in step 6, first make stop cuts with a knife along the outside of the pattern lines to a depth of ⅛", making sure the cuts connect in the corners, without crossing into the pattern. Take your time as you work along the stems; one stray cut could sever them completely.



9 Use a skew chisel to remove the material between the stop cuts. Repeat steps 8–9 until you've reached a depth of ⅜". As you near this depth, be careful not to cut too deep with your knife; the bottom of the hole should be smooth and free of cut marks.



10 Now, waste the background away with a gouge, working out from the first outline cuts toward the oval line surrounding the pattern. For these cuts, use a slightly exaggerated scooping motion, plunging the gouge into the wood at about a 45–50° angle and laying it nearly flat as you take out 1"-long slices.

14 To make leaf veins, first draw them in freehand with flowing lines, then lay the V-tool on its point, and make shallow incisions along the lines.

15 Finally, you'll need to "clean up" the loose shavings around the outside of the pattern and add to the carving's illusion of depth with undercuts. Start by plunging a knife in at a slight inward angle and making short cuts along the pattern as shown *above*. Be careful to cut only as deep as the background.

16 With a straight chisel, remove the material you just cut in step 15. Flatten the gouge tool marks closest to the pattern by gently scraping their ridges with a straight chisel.

Now, wipe mineral spirits over the carving to reveal any unwanted cut marks. Finish both sides of the piece immediately.

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Written by Bill Krier with Jim Rose and Jim Downing
Photographs: Bob Calmer Illustrations: Jim Stevenson

Don Adams, *right*, fashioned his first bow when he was six years old. "We lived in a valley in Oregon's coastal mountains, and my family didn't have money for gifts. So, when I wanted a bow, I cut a sturdy sapling, took a string out of a feed sack, and sat down and whittled one."

In his 55 years, Don has labored as a certified aircraft mechanic and builder. He's also handcrafted many a wooden boat. But ever since his early teens, he's been a bowyer at heart. The first English longbow he attempted was for his wife, Vivian, before they were married in 1957. He's still in love with both.

Longbows of Oregon yew by

DON ADAMS, A MASTER BOWYER ROBIN HOOD WOULD HAVE LOVED

Robin Hood lives on in Don Adams' shop. No day goes by without mention of the legendary archer. "Doggone right there was a Robin Hood!" the master bowyer responds at the drop of the question. "He was a longbowman."

Don could hardly believe otherwise. After all, he specializes in crafting the historic weapon. In fact, this Elmira, Oregon, craftsman ranks as one of the few bowyers in the world to conquer the intricacies of building the bow he anachronistically calls "the atom bomb" of the Middle Ages.

"There's nothing prettier in the world of archery than the English longbow," sighs the brawny bowyer. "Then, there's its history."

Caught up, Don spins the tale he's no doubt spun countless times. "A longbowman could easily loft 15 arrows a minute, and accurately penetrate a knight's armor at 200–300 yards!" His excitement grows as he delves into the archives. "At the Battle of Agincourt in 1415, an English army of 5,000 equipped with longbows defeated 35,000 Frenchmen! As a matter of fact, archery was England's mainline defense for centuries. Common English names reflect that—Archer, Arrowsmith, Bowman, Fletcher."

ROYAL BOWMEN THANK HEAVEN FOR YEW

Archers in the Queen's Scottish Royal Company of Guards and the Woodmen of Arden, in England, regularly wait two years and more for Don's made-in-Oregon, yew longbows. American bowmen gravitate to them, too, even at Mercedes-class prices of $500 or more.

Standing as tall as a man, English longbows are *long* bows. Don's research indicates they often approached 7′ in length unstrung. His models rarely exceed 6′.

Longbows were made from several different woods, including ash and elm, according to the bowyer. "Yew [*Taxus baccata*] was the cream of the crop, though," Don says. "To me, it's God's gift to the archer. It's a natural lamination as it comes from the tree. For the back of the bow [outside of the curve] you have the natural sapwood to give you the stretch. From inside the tree, you have the heartwood for the belly that gives you compression and spring."

Don's yew grows right in Oregon—above 2,500′ elevation in the nearby Cascade Mountains. Only about one out of every 200 trees of Pacific yew (*Taxus brevifolia*) will do for a bow. "The grain has to be straight, with no limbs or knots," he explains. "And the best wood has a dense heartwood with a thin, uniform band of sapwood."

LEAN STAVES WORTH THEIR WEIGHT IN GOLD

Yew trees don't grow big. At best, a yew trunk about 12″ in circumference yields two or three staves 1½″-square and about 3′ long.

Don will later match the grain of the short staves and pair them for joining as future longbows. He rarely finds a trunk defect-free and tall enough for a self-bow—that is, one made from a single stave of yew.

Continued

Print this article

To see how the grain runs and to check for imperfections, Don first peels away the bark from the felled timber, then splits the yew logs in half. He discards the core.

With a straightedge, Don lays out how his staves will run down the length of yew and marks their outlines. At the bandsaw, he frees them. "I end up using only about the outer 1½" of the tree," he says.

Don works off small imperfections when he shapes the stave. He repairs some large faults. "I'll drill out a pin knot and fill it with a 'Dutchman,' a carved yew plug."

In the damp Oregon climate, green yew staves must air-dry, unsealed, indoors for four years. Before laying a stave to rest, Don marks it for the bow size it will eventually become, and dates it.

"You can see why I value a stave as highly as gold." Don slides his muscled hand down a silken piece of yew. "I haul out an awful lot of scrap to get one pretty stave."

MYSTERY STILL LURKS IN THE BOWYER'S SHOP

In merry old England, the bowyer's closely guarded craft was a family endeavor, with trade secrets passed down from generation to generation. In the 20th century, bowyers make their way alone. "You just don't learn how to create these bows quickly," Don remarks.

Trial and error taught Don the correct way to make a longbow. "I've had bows that broke, bows that were crooked," he chuckles.

That's because English longbows, seemingly of simple design, actually challenge the bowyer with subtle engineering dynamics. Don explains: "The cross section is a D-shape. Not square. Not rectangular. The belly is always round, the back the natural shape of the tree. Of course, that D-shape varies from bow to bow. It can look sort of flattened, or it can be bulgy. The shape of the cross section even varies along the length of a bow."

The bowyer has to determine from his experience what shape to make the belly. "Therein," Don remarks, "lies the secret of whether you have a good bow or a poor one. Anyone can make a longbow look-alike, but it won't last alike. And, it won't shoot alike."

The bowyer has three parameters in making a bow. He must know the archer's draw length (length of the arrow, averaging 27–28"); what pound-pull (force at which the bow will launch an arrow, usually from 25–100 pounds) the archer desires; and, whether the archer is right- or left-handed.

"The pound-pull and draw length determine which stave I pick," says Don. "You never want a bow with more wood than it needs. You have to read the wood—how a shaving breaks and comes apart."

Not unlike the artisan of old, Don keeps many of his bowyer's techniques a secret, willing only to impart them to an apprentice, should he ever have one. "I have jigs I invented out of necessity, to keep from ruining a good stave," he notes. "In this shop, ruining yew is a hanging offense."

During his trial-and-error stage, Don mastered the joinery to merge two staves into a bow. He calls it a finger splice. On his finished bows, it can't be seen, not only because it's wrapped with leather where it occurs—at the handle—but because it's such a fine-fitting joint (see photo, *below*). The jig Don perfected he shows to no one.

A neat finger splice at the handle often joins two yew staves to make an English longbow. A leather wrap will cover it.

PERFECTING THE ARC AT THE TILLER BOARD

Being a master bowyer means never wasting a stave. Consistency reigns in bow production. "There's no surplus of staves," says Don. "I have to end up with the pound of bow and draw-length that the customer wants without doing it two or three times."

A window provides the natural light he prefers for working a stave.

Don works the stave down with a drawknife and a spokeshave, starting at the splice if the bow has two staves. He calculates the handle's location, shaves it to shape, then begins paring the stave to a rough bow form. To find out just where and what has to be done to achieve the right shape, the bowyer mounts the roughed-out bow in the tiller board (see photos, *below left*).

"I file in some temporary nocks and put a string on it longer than the bow length. At the tiller board, I start pulling and watch how it bends," Don notes. "You can have too much wood on one side of the limb and it won't bend right. What I want is to have it bend uniformly from the handle. Vertically, the string must split the bow in half. If not, stress progresses to a crooked bow, then a broken one."

Don practices reserve and caution in taking off wood. He says the easiest mistake to make is cutting the stave down too fast, a practice that usually ends up with a bow under the customer's specified pull weight. "You have to go slowly by hand because it's such a fine line between a 40-pound bow and a 50-pound bow. One mistake and you can only hang it on the wall."

GENUINE COW-HORN NOCKS FOR THE ENGLISH LOOK

Don gives his longbows what he calls the "English look" with genuine cow-horn nocks for attaching the bowstring. The leather-wrapped handle adds time-honored appeal.

The name of the finish Don sprays on still lurks in his bag of tricks. He admits, though, that it's a modern one. "I spray on four to six coats, and sand and steel-wool in between. It really has to seal the wood. Otherwise, on a wet day the pound-pull of a bow will change as much as 10 percent."

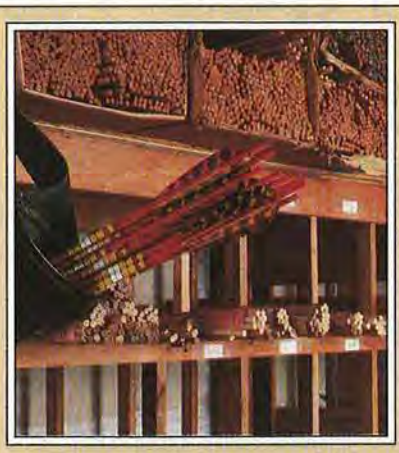
Although English longbows from Don's hand have brought down big game across the continent and in Alaska, they have a romantic look. "I make a sporty, gentleman's type bow," he states. Even so, Don's bows never fail to put an arrow where it's aimed.

Top left: **Working a one-piece stave called a self-bow, Don first shapes the handle with a spokeshave. Note the yew's uniform sapwood thickness along the bow's back.**

Top right: **No less a work of art than a painting or sculpture, Don's longbows receive his signature.**

Bottom left: **The phrase "high strung" comes from stringing a bow too high on the handle, resulting in erratic performance. Don checks for nock position prior to tillering.**

Bottom right: **Tillering a bow shows the bowyer exactly where he needs to remove more wood. By means of a rope and pulley, Don draws the bow to its specified poundage and eyes its arch for irregularities in shape.**



OREGON ARROWS, TOO!

Bowyer Don Adams also makes arrows. "Of nothing but Oregon-grown Port-Orford cedar," he notes, "by and large the most reliable arrow wood there is."

Don's cedar supply was cut more than 30 years ago, specifically for arrows. He says it's superior to wood available today—properly seasoned and fine- and straight-grained. "The shafts have a distinctive cedar aroma, a smell archers hate," he laughs. "It means a broken arrow!"

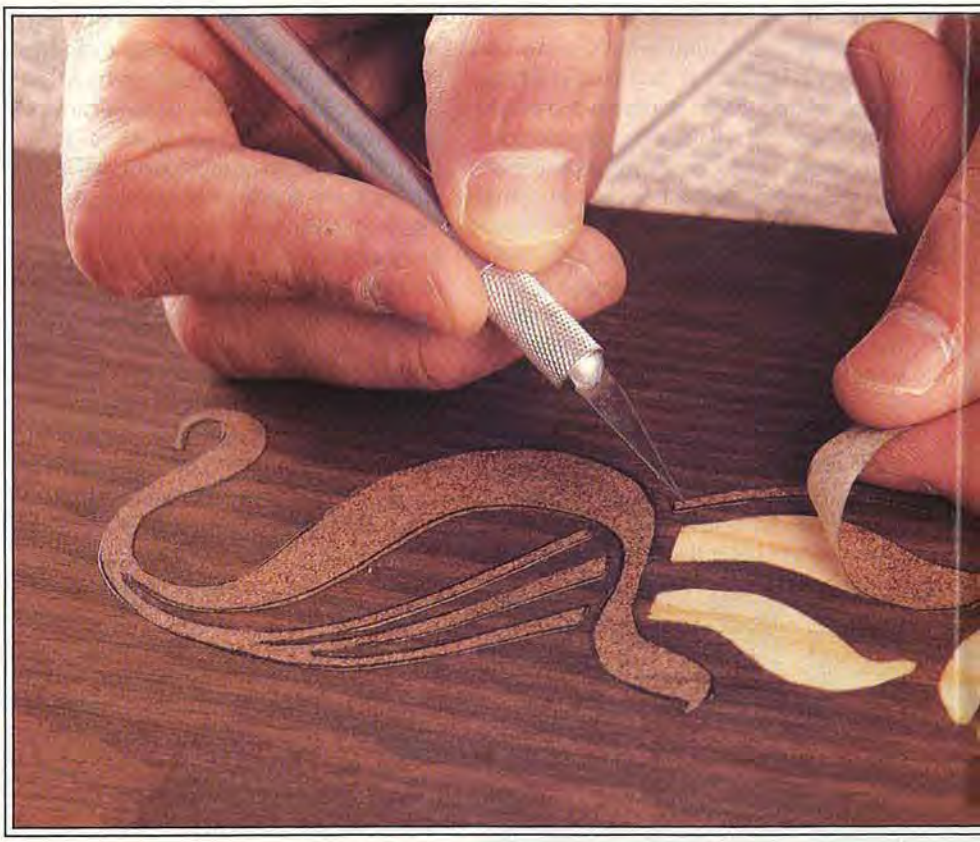
To make arrows, Don cuts 4×8×33" cedar bolts into $^{13}/_{32}$" squares and runs them through a doweling machine. The machine produces tapered dowels. After sanding the dowels, Don splines them to receive a fletch of dyed turkey feathers, then, they're nocked with plastic. Don's wife, Vivian, dips the arrows in a clear finish, then crests (paints color bands) on the shafts. "She's a master," says Don.

Written by Peter J. Stephano
Photographs: Kenneth Naversen

TRY STAIN-RESIST

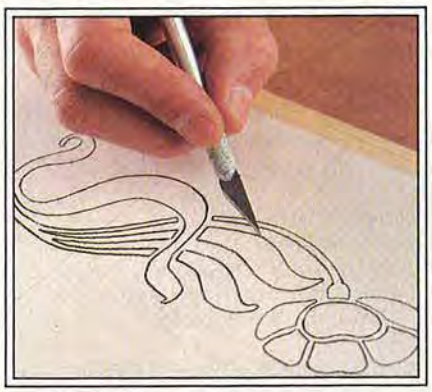
When *WOOD*® magazine reader Dick Link told us about how he was able to place patterns on wood that look like finely placed inlay, we were skeptical. But not any longer! We tested this San Antonian's technique in our shop—and added a couple twists of our own—and we're convinced that this is something worth trying.

Note: *Before trying this technique on your workpiece, practice the procedure on a piece of scrap stock of the same species, with similar grain pattern. Naturally, you don't want to botch your project with a bad finish, so be certain you're pleased with your test piece. We obtained satisfying results with Deft spray stain and Deft clear semi-gloss lacquer finish, but you may want to experiment with other finishes.*

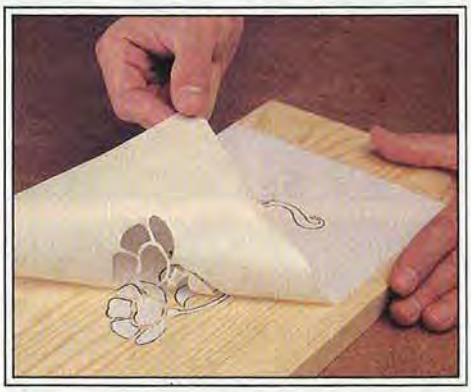


1 Once you've decided on a design that complements your workpiece (we've provided a half-sized pattern on the next page to get you started), transfer the pattern to a sheet of self-adhesive paper. See the Buying Guide for additional information. Plain-paper copiers provide an easy means to do this, and many machines allow you to reduce or enlarge the image. Or, use carbon paper.

2 Next, seal the self-adhesive sheet by spraying it with two mist coats of lacquer, allowing 5 minutes drying time between applications. The lacquer seal prevents stain from penetrating the sheet and leaving sticky residue on the work piece. Although the lacquer forms a protective barrier, heavy applications of it may by itself dissolve the adhesive, so go lightly with the lacquer as well as later coats of stain.



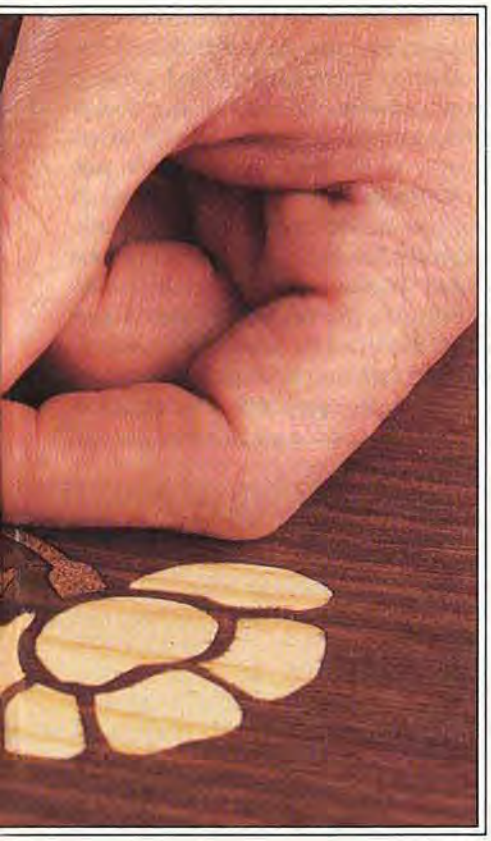
3 Finish-sand the project by hand with 150-grit sandpaper, and wipe the surface clean with a tack cloth. Then, peel the backing from your pattern, and apply the sheet onto the work surface. Firmly rub the pattern down with your hand for strong, even adhesion. With an X-acto knife, carefully cut along the pattern lines as shown, going deep enough to completely cut the paper.



4 With the cutting completed, slowly lift the self-adhesive sheet by one corner and remove it, leaving the pattern adhered to the wood surface. If part of the design area lifts up because of incomplete cuts, just lower it back to the surface and clip it free with your X-acto knife. Now, with clean hands, rub the segments of the design to make sure they're securely adhered to the wood.

Print this article

FINISHING FOR AN IRRESISTIBLE COUNTRY LOOK

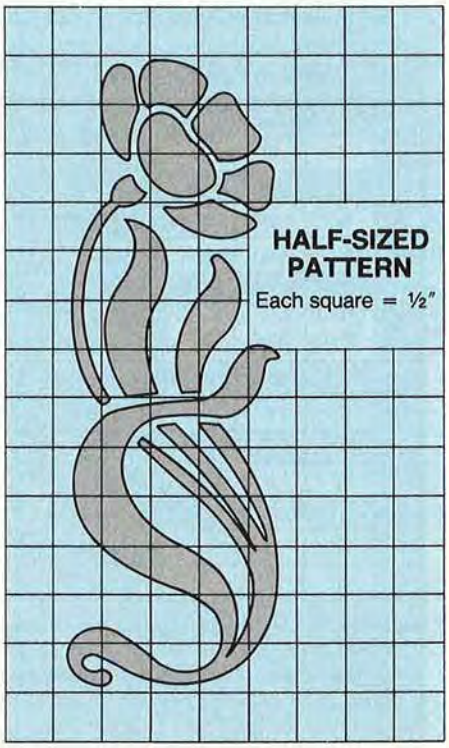


6 Now, lift the pattern pieces from the wood as shown *left* with an X-acto knife to reveal the unstained area. Allow the project to dry overnight.

With the stain completely dry, use a clean finger to rub away any adhesive residue. If the amount of residue seems excessive, remember to make lighter applications of stain on your next project. Now, spray a light, even coat of lacquer to the entire surface. If you like the appearance of the project at this point, skip the next step and apply one more coat of lacquer to finish the piece. If you'd like to soften the contrast between the pattern area and the rest of the wood surface, proceed to the next step.

7 To enhance the country look of your project, spray another coat of stain over the entire surface and immediately wipe it with a clean cloth. The lacquered area will accept some stain, giving a subtle variation in tone between the pattern and background. After allowing the surface to dry completely overnight, apply two more coats of lacquer to finish the project. Here, side-by-side are the two doors for our project; we skipped the final step with the door on the *far right*, giving greater contrast between pattern and background.

5 Spray a light coat of stain on the entire surface, immediately wipe it with a clean cloth, and let it dry for 5 minutes. If you'd like a darker look, repeat the process as necessary, allowing 5 minutes drying time between coats. For close-grained woods that tend to stain unevenly, such as pine or maple, lightly spray on a final mist coat and don't wipe it. Allow this coat to dry 5 minutes also.

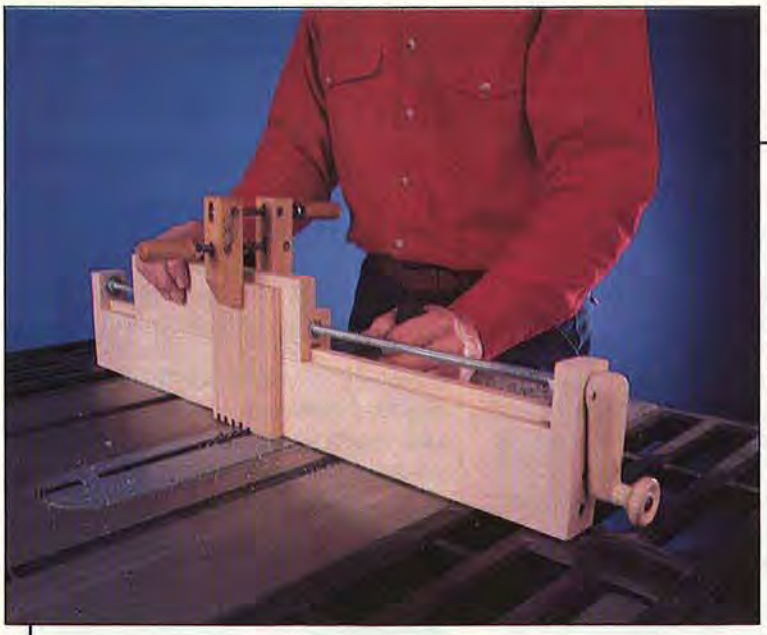


We gave a country look to this simple cabinet, using some spray finishes and self-adhesive paper. For another country cabinet project, see page 76.

Buying Guide

● **Avery 8½×11" self-adhesive sheets.** 100-sheet box (No. 5353), $19.75 ppd. (Iowa residents, $20.47 ppd. with tax) from Ahern Pershing Office Supplies, 300 S.W. Fifth St., Des Moines, IA 50309.

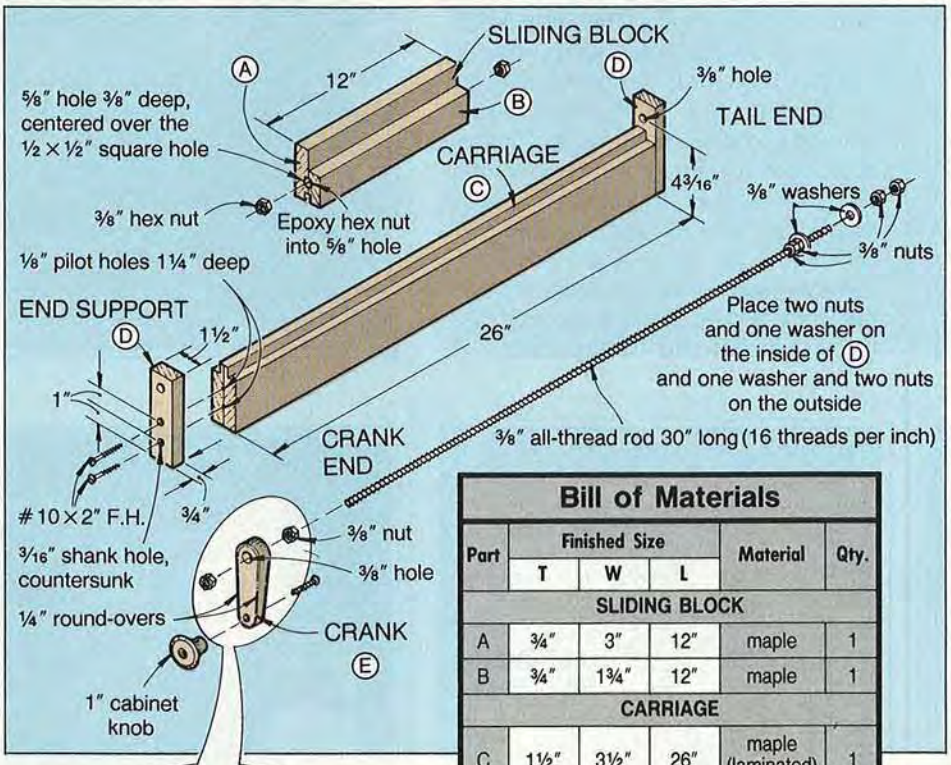
Contributor: Dick Link Photographs: Bob Calmer

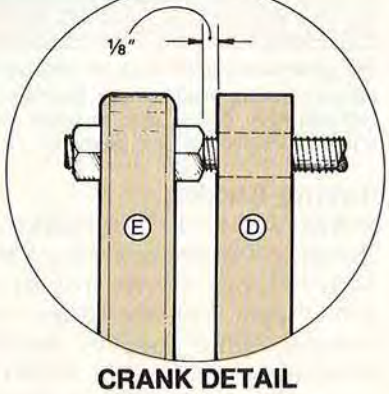


When being close just won't do

THE ACCURATE

You'll seldom meet a woodworker who doesn't appreciate the good looks and durability of a box joint (also called a finger joint). But, most woodworkers hate all the setup-fuss. Wilbur Rath, a retired dairy farmer from Shiocton, Wisconsin, took the problem to heart. He designed his own box-joint jig, and decided to share his design with us. He uses the jig for making small storage boxes for his basement shop and gift boxes for friends. You'll marvel at how quickly and accurately Wilbur's jig positions the wood; each revolution of the handle moves the workpiece exactly 1/16". To put your new jig to use, turn to page 78 and give our recipe-card box a try.



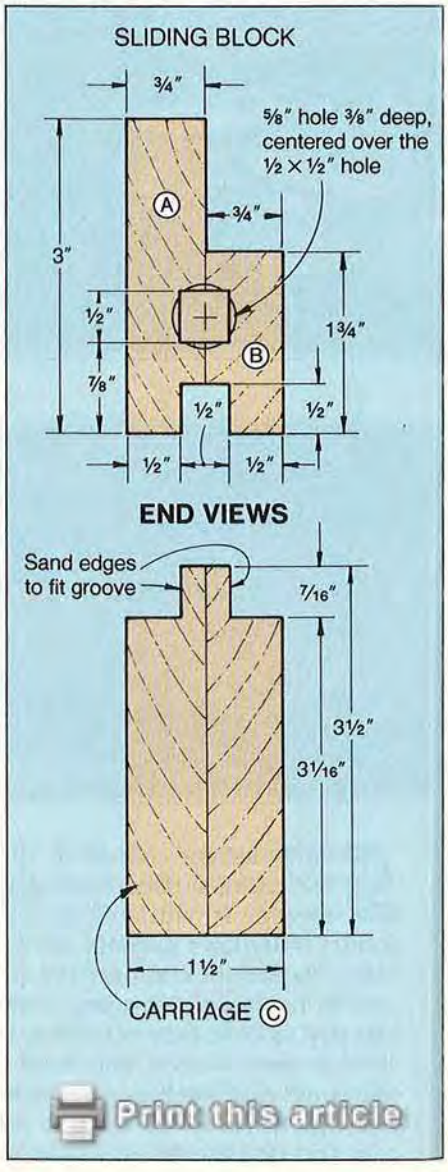


CRANK DETAIL

Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
SLIDING BLOCK					
A	3/4"	3"	12"	maple	1
B	3/4"	1 3/4"	12"	maple	1
CARRIAGE					
C	1 1/2"	3 1/2"	26"	maple (laminated)	1
END SUPPORTS					
D	3/4"	1 1/2"	4 3/4"	maple	2
CRANK					
E	3/4"	1"	3 5/8"	maple	1
VERTICAL SUPPORT					
F	1/4"	6"	12"	plywood	1
G	3/4"	3/4"	6"	pine	1

Supplies: 8—3/8" hex nuts, 3/8" all-thread rod 30" long, 2—3/8" washers, 1" cabinet knob and mounting screw, 4—#10 × 2" flathead wood screws, 2—#8 × 3/4" flathead wood screws, quick-set epoxy, finish.



BOX-JOINT JIG

FORM THE SLIDING BLOCK AND CARRIAGE

1 Rip and crosscut the sliding block parts (A, B) and carriage parts (C) to the sizes listed in the Bill of Materials.

2 Cut or rout a ½" groove ¼" deep and ⅞" from the bottom edge on the inside face of each sliding block part. See the End View Drawing *below left* for location

3 Glue and clamp the sliding-block pieces together, with the bottom edges and ends flush. Repeat the gluing and clamping procedure with the two carriage parts.

4 After the glue dries, scrape the excess from the bottom edge of the sliding block and both edges of the carriage. Joint the edges if they are not flush. Now, cut or rout a ½" dado ½" deep centered along the bottom edge of the sliding block where shown on the End View Drawing. (We used a ½" dado blade and cut the ½"-deep groove on the tablesaw.)

5 Crosscut the ends of the sliding block and carriage. The sliding block should be 12" long and the carriage 26" long.

6 Cut or rout a pair of ½" rabbets 7/16" deep along the top edges of the carriage. Position the dadoed edge of the sliding block on the rabbeted edge of the carriage. The sliding block should slide freely on the carriage with a minimum of free play. If the block doesn't slide easily, scrape or sand the rabbeted edges of the carriage where indicated on the End-View Drawing.

EPOXY THE HEX NUTS INTO POSITION

1 Clamp the sliding block upright in a bench clamp. Now, drill a ⅝" hole ⅜" deep *centered* over the ½×½" square hole into the end of the sliding block. (We used a Forstner bit.) If your drill-press table tilts, you could clamp the sliding block to the table, tilt the table, align the bit over the square hole, and drill the ⅝" hole. Repeat the process to drill a hole in the opposite end of the sliding block.

2 Push a ⅜" hex nut into one of the holes just drilled in the sliding block. From the opposite end, insert a ⅜" hex nut into the other ⅝" hole. Thread the ⅜" all-thread rod through the sliding block, through the other hex nut, and about 2 or 3" past the second nut.

3 Once again, clamp the sliding block upright in a bench clamp. Mix a small amount of epoxy (we used quick-set). Being careful not to get any epoxy onto the all-thread rod, epoxy the top ⅜" nut into the ⅝" hole. (We used a nail to fill the epoxy into the cavities around the nut.) Immediately wipe off any excess epoxy. Later, after the epoxy has hardened, flip the assembly over, and epoxy the other nut into the opposite hole.

ADD THE END SUPPORTS TO THE CARRIAGE

1 Cut the end supports (D) to the size listed in the Bill of Materials.

2 Mark the hole centerpoints, and drill a ⅜" hole through each end support where dimensioned on the Exploded-View Drawing.

3 Thread two nuts and add a washer onto the tail end of the all-thread rod. As shown in the photo *below*, slip a support (D) onto each end of the rod and against the ends of the carriage. Epoxy and clamp the supports to the ends of the carriage as shown in the photo. Position the end supports so the rod goes through the center of the hole in each support. Don't worry about the bottom end of the supports being perfectly flush with the carriage—just check that the rod remains straight.

Epoxy the end supports to the carriage, being careful not to bend the rod.

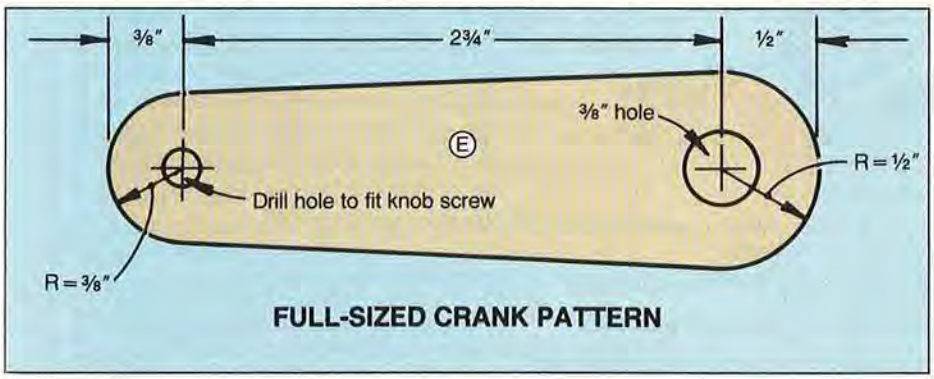
4 Remove the clamps, drill the shank and pilot holes, and further secure each end support to the carriage with #10×2" wood screws. Sand the end supports flush with the carriage, and then finish-sand the entire assembly.

NOW FOR THE CRANK

1 Using carbon paper, transfer the full-sized crank pattern outline and hole locations to ¾" maple stock. Drill the holes where located, and then cut the crank (E) to shape.

2 Rout a ¼" round-over on the crank edges where shown on the Exploded-View Drawing. (To keep our fingers safely away from the router bit, we held the crank in a handscrew clamp as we cut the round-over on a table-mounted router.) Sand the crank smooth.

Continued



FULL-SIZED CRANK PATTERN

BOX-JOINT JIG

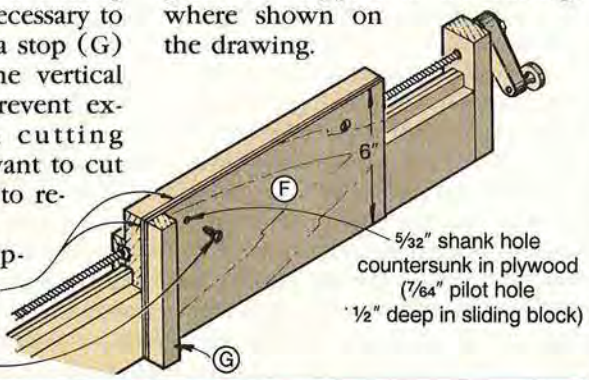
3 Double-nut the *tail* end of the rod to the end support. Position the nuts so the rod has no free play at the tail end support, yet turns easily when rotated. (For tight-fitting joints later, you may need to adjust the nuts several times to eliminate any free play.)

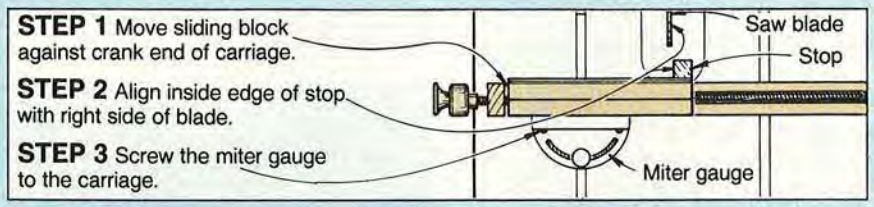
4 Attach a cabinet knob to the crank. Next, fasten the crank to the all-thread rod with two nuts. Leave a ⅛" gap between the inside nut and outside face of the end support where indicated on the Crank Detail accompanying the Exploded-View Drawing.

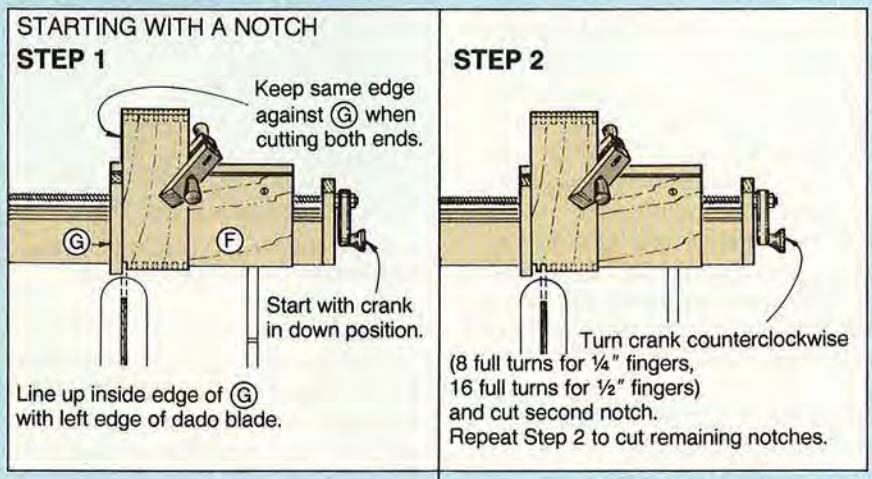
SCREW ON THE VERTICAL SUPPORT

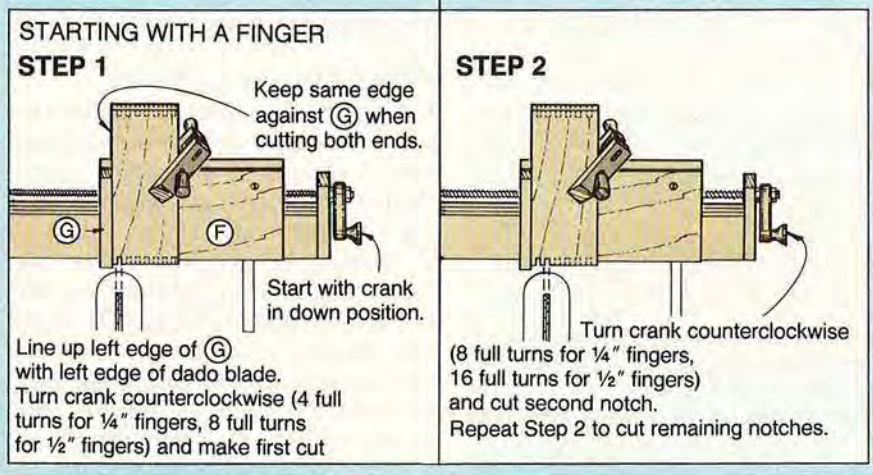
To keep a long workpiece square with the saw table when cutting the joints, we found it necessary to add a support (F) with a stop (G) to the sliding block. The vertical support also helps to prevent excess chipping when cutting notches, so you might want to cut several vertical supports to replace the cut-up ones.

Build the vertical support (F, G) as shown on the drawing *below* and dimensioned in the Bill of Materials. Screw—*but do not glue*—the support to the carriage where shown on the drawing.




STEP 1 Move sliding block against crank end of carriage.
STEP 2 Align inside edge of stop with right side of blade.
STEP 3 Screw the miter gauge to the carriage.
Saw blade
Stop
Miter gauge


STARTING WITH A NOTCH
STEP 1
Keep same edge against G when cutting both ends.
G
F
Start with crank in down position.
Line up inside edge of G with left edge of dado blade.
STEP 2
Turn crank counterclockwise (8 full turns for ¼" fingers, 16 full turns for ½" fingers) and cut second notch.
Repeat Step 2 to cut remaining notches.


STARTING WITH A FINGER
STEP 1
Keep same edge against G when cutting both ends.
G
F
Start with crank in down position.
Line up left edge of G with left edge of dado blade.
Turn crank counterclockwise (4 full turns for ¼" fingers, 8 full turns for ½" fingers) and make first cut
STEP 2
Turn crank counterclockwise (8 full turns for ¼" fingers, 16 full turns for ½" fingers) and cut second notch.
Repeat Step 2 to cut remaining notches.

TIPS ON USING THE JIG

Attach the jig to your miter gauge where shown and described on the three-step drawing at *left*.

When using the jig, remember that each crank revolution moves the sliding block 1/16". To make indexing easier, always start with the crank in the down position. The wood crank will probably not be in the down position after aligning the dado blade with the inside edge of the stop. If this happens, loosen the nut on the outside of the crank, let the crank fall to dead bottom, and then tighten the nut.

Attach the dado blade to the tablesaw, and raise the blade to the same height as the thickness of the piece being cut. Now, raise the blade 1/32" higher so you can sand the fingers flush later.

To start with a notch, follow Steps 1 and 2 on Starting With A Notch Drawing. To start a finger, follow Steps 1 and 2 on Starting With A Finger Drawing. (The first time we used the jig, we found it helpful to marked the location of the notches and on one end of a board. Following the steps at *left*, we positioned the workpiece and cut the notches.)

Produced by Marlen Kemmet
Project Design: Wilbur Rath
Photographs: Jim Kascoutas; Bob Calmer
Illustrations: Mike Henry; Bill Zaun

Print this article

ISHI

THE LIVING WINDOW TO INDIAN CRAFTSMANSHIP

On the morning of August 29, 1911, the last "primitive" Indian in North America stumbled out of the Stone Age. His name was Ishi, the only survivor of Northern California's Yahi tribe.

Cornered by a posse with snarling dogs, the dark-skinned intruder in modern times gave up escape. For two terrifying days, Ishi was captive. Then, a white-skinned stranger carrying papers entered his cell.

Sitting beside him on the cot, the man began to say unfamiliar words as he pointed to things. Finally, the man pointed at the wooden cot frame, and said "*siwini.*" Ishi jumped—he knew Ishi's people's name for pine!

Ishi's visitor was T.T. Waterman, an experienced anthropologist from the University of California. Ishi returned to the San Francisco area with Waterman and eventually took up residence at the Museum of Anthropology in Berkeley. There, in a living display, Ishi demonstrated to visitors his skill as a master woodcrafter.

HANDCRAFTING BOWS AND ARROWS

At the museum, Ishi showed his new friends how he made hunting bows from hickory, ash, yew, or mountain juniper. When he found the proper branch, Ishi split it into a rough billet, then set it aside to slowly season. Later, he brought it closer to its final shape with knives, adzes, and scrapers of obsidian (a black, volcanic glass). For the final smoothing, he rubbed the bow over and over with sandstone.

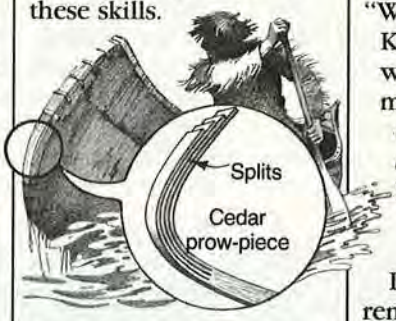
To recurve the ends of his bow, Ishi worked them over a heated stone until the wood became pliable. Carefully, he bent the wood around his knee, holding it in place while it cooled and set. Ishi treated his newly crafted bow as a living thing, protecting it from heat and damp. Despite his newly acquired possessions from the modern world, he loved his bow as he loved nothing else.

Ishi also made his arrows in the ancient way of his people. He peeled the bark from thin branches of the hazel shrub, and slowly straightened the rods by rolling them back and forth on heated stones. As with his bow, he smoothed the wood with sandstone. For a final polish with oil, Ishi drew the shafts across his naked thigh.

To make an arrow targeted for big game, Ishi socketed a foreshaft of heavier wood onto the mainshaft. First, he chipped a drill point from flint. Then, he held the point upright between his feet and, by rolling the shaft between his palms, spun the shaft on the point. When the socket in the end grain was about 1" deep, he tapered the other section of shaft and joined the wood with a dab of sticky pine resin.

COAXING WOOD TO FUNCTIONAL SHAPE

Ishi's skill in shaping natural materials was typical of native Americans. The formidable prow piece of the birch-bark canoe was perhaps the finest expression of these skills.

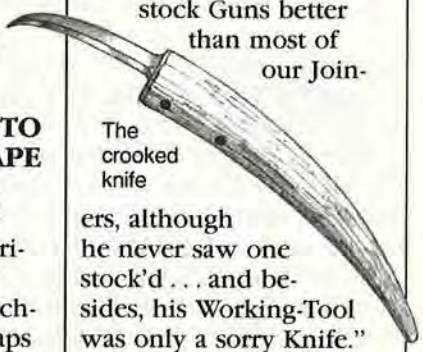


The canoe builder relied on an ingenious method. He repeatedly split a cedar billet halfway down its length, dividing the wood into dozens of thin leaves, like the many pages of a book (see illustration *above*).

The piece could then be readily bent as the leaves slid past one another. Glued in place with pine resin, the prow piece retained its shape and had the great strength of multiple layers of laminated wood.

CARVING AND THE CROOKED KNIFE

From the earliest days of contact, the Europeans marveled at Indians' woodcarving skill. John Lawson, the English explorer, wrote in 1709, "I have known an Indian stock Guns better than most of our Joiners, although he never saw one stock'd . . . and besides, his Working-Tool was only a sorry Knife." Lawson also noticed that "When they cut with a Knife, the Edge is towards them.' Lawson may have described the crooked knife, shown *above*, which probably began as a beaver tooth set in a handle made of bone.



The crooked knife

In the five years that remained of Ishi's life, he gave a priceless window into his vanished world. Archaeologists continue to explore Stone Age technology by making stone tools, whereas Ishi shared firsthand his master craftsmanship.

By Roy Underhill
Master housewright at Colonial Williamsburg, host of the popular PBS series *The Woodwright's Shop*, author, and lecturer.

Illustrations: Jim Stevenson

Print this article

KING CHERRY

A story about prime Pennsylvania furniture wood, the people who bring it to you, and—Oh deer!—its future.

WOOD® OFF THE ROAD

Why trudge the winter woods to look at trees? That's what I wondered when I first talked with Jonathan Wirth, a Kane, Pennsylvania forester. "We have more of the very best cherry than any other place in the country," he replied over the telephone. "But, unless we can do something about the deer numbers, cherry may not be here in the future!"

Sure enough, in that idyllic mountain setting where huge black cherry trees are as abundant as toothpicks at a sweet-corn festival, foresters have a problem. Deer. Bambi aside, foresters believe the area has just too many of these cute critters for the future good of the state's cherry resource. I saw the problem firsthand, and now realize why this favored cabinet wood continually rises in price. I also got an up-close look at the people and the practices that try to assure tomorrow's supply.

Peter J. Stephano

Features Editor

Pete Stephano brushes snow from next century's cherry trees.

Cherry brings the whole world to Kane," says Ed Kocjancic with the knowing grin of a successful wood trader. "Canadians. Europeans. Japanese. Taiwanese. Here's the only area in the world where they can get a very valuable wood in quantity. And cherry has been king here for a long time."

According to Ed, an experienced forestry consultant who sells veneer logs internationally, 75 percent of the best quality cherry anywhere grows within a 30-mile radius of Kane (pop. 5,000), the hub of hardwood logging in the Allegheny Mountains of Pennsylvania.

Ed explains why buyers beat a path to Kane. "The color, the low gum content, the straightness of grain, the lack of knots," he says without hesitation. "There's probably a dozen defects that buyers look for, but they find fewer of them here, and get size."

Size indeed! Cherry logs containing 1,000 board feet of this classic cabinet wood aren't rare. And, sawmills around Kane process cherry boards 4" thick.

CHERRY: A GIFT FROM YESTERYEAR'S LOGGERS

Without knowing it, the turn-of-the century loggers and lumber companies created another vast wood resource when they cleared white pine and hemlock from the Allegheny Plateau forest. In felling the overhead canopy of interlocked branches, they bathed the forest floor in sunlight. Ash, cherry, and other hardwood seeds lying dormant in the debris of the forest floor responded and quickly sprang up as a carpet of seedlings.

▲ Ed Kocjancic grades the cherry veneer logs he sells on the world market. He points to a log's core flaw.

Eighty-odd years later, the eight-county region where the great conifer forests once stood now boasts stands of fine cherry and the other hardwoods foresters dub as the "Allegheny hardwood subtype."

"The quality comes with the quantity," remarks Mike Collins, vice president of Kane Hardwood, a major sawmill in the area three hours drive north of Pittsburgh. "Where trees naturally grow the best, they also produce quality."

Kane Hardwood, its 150 employees and the platoons of loggers who contract to bring in the timber, as well as the 50 or so other sawmills within an hour's drive, depend on that quality and quantity. Mike, a forester by profession, has the responsibility for feeding the mill its annual log diet of 20 million board feet. Of that, cherry and red oak make up roughly 60 percent.

What the future holds, particularly for cherry, has the graying executive perplexed. That's because growing cherry and other commercial hardwoods in Pennsylvania differs greatly from the cut-and-replant softwood forestry practiced in the South and West. In Pennsylvania's hardwood forests, nearly all new trees occur naturally, from fallen seeds, pits of their fruit, or stump sprouts of harvested trees, a process called "regeneration."

Instead of planting young trees, foresters manipulate their harvesting methods and amounts of timber taken at any one time to encourage the growth of desirable lumber species. Their success in regenerating a forest, though, depends on a sufficient number of seedlings already beginning to grow under the mature trees to be harvested, a situation they call "advance regeneration."

Continued

To foresters, that means to harvest an acre of 100 trees in 80–100 years, advance regeneration must number 10,000–100,000 seedlings on that same acre! The stupendous number allows for natural casualties from weather, disease—and particularly in the Allegheny Plateau around Kane—deer.

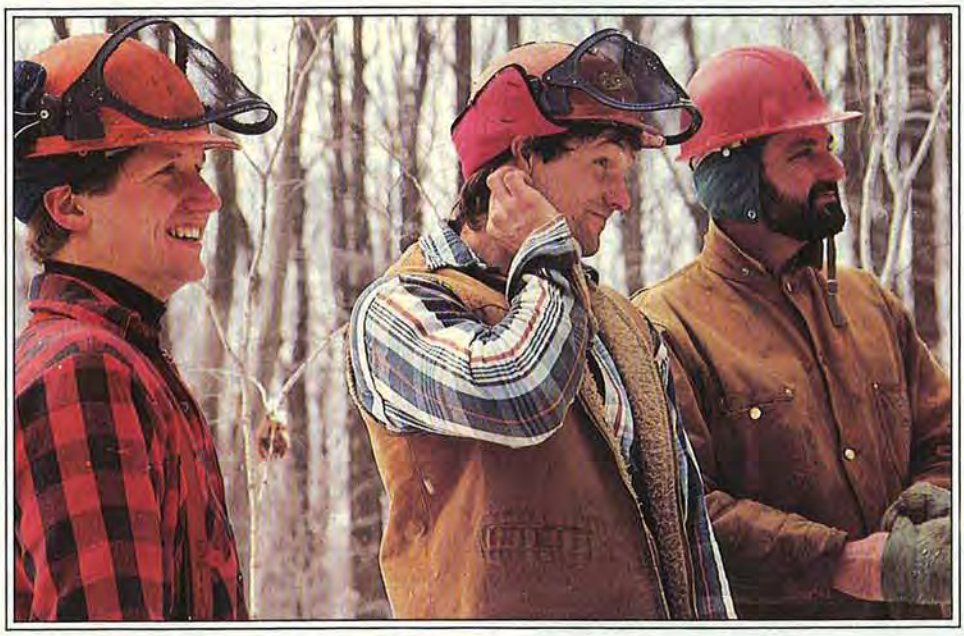
MORE FAUNA THAN FLORA IN THE ALLEGHENIES

"Deer run real thick in places," says Mark Kulka, 27, a logger who, with the help of younger brother, Scott, 23, contracts to cut cherry and other species for Kane Hardwood. "I was cutting down by the Elk County line late last winter," Mark recalls, "and there were just herds of them coming out of the timber. I hit one with a tree I dropped, it got that close."

"That's what I said," exclaims Jonathan Wirth, 35, a forester who works for Kane Hardwood. On the drive from town to the logging site, he remarked that in the winter when food is scarce, deer respond to the sound of a chain saw as if it were a dinner bell.

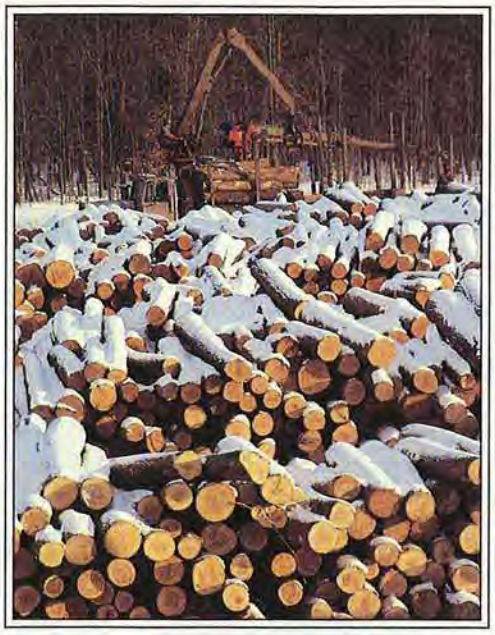
Deer browsing tender new growth from the tops of downed timber prove an amusing nuisance to loggers on the Allegheny Plateau. However, to Dr. David Marquis, head of the U.S. Forest Service's silviculture (tree-growing) research unit in nearby Warren, those instances mean more. Deer threaten the quality, value, and diversity of the region's wood resource.

The research forester's laboratory doesn't have walls. It's situtated a half-dozen miles into the national forest from the nearest country crossroad. There, a 200-acre study area divided and subdivided by fences shows what happens to the forest under different deer populations. "Eastern forests can only support about 15—20 deer per square mile. The Pennsylvania Game Commission estimates the per-square mile deer population around here to be between 30–35," states Dave. "I think there's more deer than that out there."



▲ **Deer hamper logger Mark Kulka, center, when working the winter woods. His brother, Scott, left, and forester Blaine Puller look over the logging site.**

▼ **Endless stacks of glowing orange cherry, some containing boards 4" thick, cover the yard at Kane Hardwood, a major sawmill.**



▲ **Ash, cherry, maple, and red oak from the surrounding Allegheny Mountains to feed the mill keep the economy alive around Kane, Pennsylvania.**

In his mini-forests, this guru of Allegheny hardwoods has discovered just what effect deer have on timber growth (see sidebar on page 57). "In the real world of the Allegheny Plateau—an area of about three million acres—if you just cut stands that were ready to be harvested right now, you'd end up with a total failure of regeneration in at least half of them, due to deer browsing. Grass or fern that deer don't eat would block seedling growth. The other half of the stands might end up with 15 percent all beech and striped maple with little commercial value. With luck, the rest would have cherry.

"Add it up," he says, his face set in stone-like seriousness. "On at least two-thirds of your land base you wouldn't have anything valuable to leave for the next century."

CULTIVATING CHERRY IN BAMBI'S BACKYARD

Despite research and forest floors chewed to desolation, Pennsylvania deer hunters still insist there aren't as many deer as there used to be. Talk of reducing the local deer herd through longer hunting periods, special doe-only seasons, and concentrating hunters in heavily browsed timber-producing areas brings outcries from sportsmen who fear depletion. Yet, even state game biologists agree that the deer herd must be brought in balance with the land. The reward for hunters would be larger, trophy-sized deer and an abundance of other game that requires a healthy forest habitat for survival.

"Hunters think about the thirties and forties when we had nothing but brush here," moans Roe (Sandy) Cochran, a Penn State University area forest resource agent. Sandy counsels land owners on forestry practices as part of his job, and remembers roaming the woods as a young man. "At that time, there was so much food the deer couldn't possibly hurt it."

According to Kane Hardwood's executive Mike Collins, artificial remedies exist to combat deer as well as fern. Fences have been tried to keep deer out. Spraying fertilizer by helicopter to get the seedlings up in a hurry was another solution. Even herbicides to kill ferns were attempted. "All methods prove too expensive," notes Mike. "Spraying can cost $200 an acre. Put that in the bank at even six percent interest and you could make more in 80 years than you could from the trees. Down the road, these expenses can't pay themselves back."

Sawmill operators like Mike play an unpopular "wait and see" game until the deer population balances with the carrying capacity of the land. Meanwhile, harvest delays raise the cost of cherry.

Here's why. Foresters must wait for a stand to develop sufficient advance regeneration (in number and size) to survive the deer before they can cut the mature trees. Delays represent dollars lost, since after reaching maturity, tree quality decreases rapidly. Delay exposes a stand to disease, rot, wind, and lightning damage. Dollar losses directly related to overbrowsing have been estimated at more than $1,000 per acre, or about half the value of the standing trees on that acre at harvest time.

Mike expresses his and other lumbermen's dilemma, "The lands that we own we intend to manage forever. Today, I'm concerned about how to get a tree back for every one that's cut."

In the section of forest that he manages for Kane Hardwood, forester Blaine Puller follows silviculture techniques to provide cherry for tomorrow. "You have to work a forest like a garden—pull the weeds and tend the tomatoes," advises the veteran woodsman, sounding like Will Rogers in hardhat and hiking boots. "But how I tend the forest depends on the type of trees I want to grow for the future."

Continued

KING CHERRY

Blaine has two options: uneven-age silviculture or even-age silviculture. Each produces a different crop. Uneven-age management maintains trees of several ages in the same stand. Over years of development, foresters direct the removal of some trees of each age to provide growing space for those that remain. Seedlings of the new stand develop in partial shade.

Since the loggers never completely cut the stand, the seedlings grow slowly. In this always natural-looking management form that's preferred for recreational land and small acreages, shade-tolerant species such as beech, hemlock, and sugar maple dominate.

In even-age management, trees all approximately the same age grow in stands covering up to 100 acres. Periodic thinnings improve tree quality and size. When the majority of the stand matures, loggers harvest the trees and a new generation of seedlings takes their place.

Valuable hardwood species such as ash, cherry, yellow poplar, and red oak tend to grow faster when exposed to the abundant sunlight of a newly harvested stand. That's why commercial foresters in Pennsylvania's cherry region practice even-age management on high-yield timber lands.

HELPING GOD OUT ON THE ALLEGHENY PLATEAU

Glancing around him at the towering cherry trees, their blackish bark rough verticals against the gray winter sky, Jonathan Wirth remarks, "A forest isn't a static thing. It's always changing. If we do nothing, it will change." Blaine joins in: "What we do is help out God."

Terry Collins, great-grandson of Kane Hardwood's founder, works as a forester alongside Blaine and Jonathan. He expresses a forester's philosophy: "You have to plan for tomorrow, knowing there will be a future benefit for what you do today. My family has been in the lumber business for four generations, and I'd like to think it will continue generations more."

Part of planning for the future means standing in the calf-deep snow today. Blaine and Jonathan shrug the cold and study the woods around them.

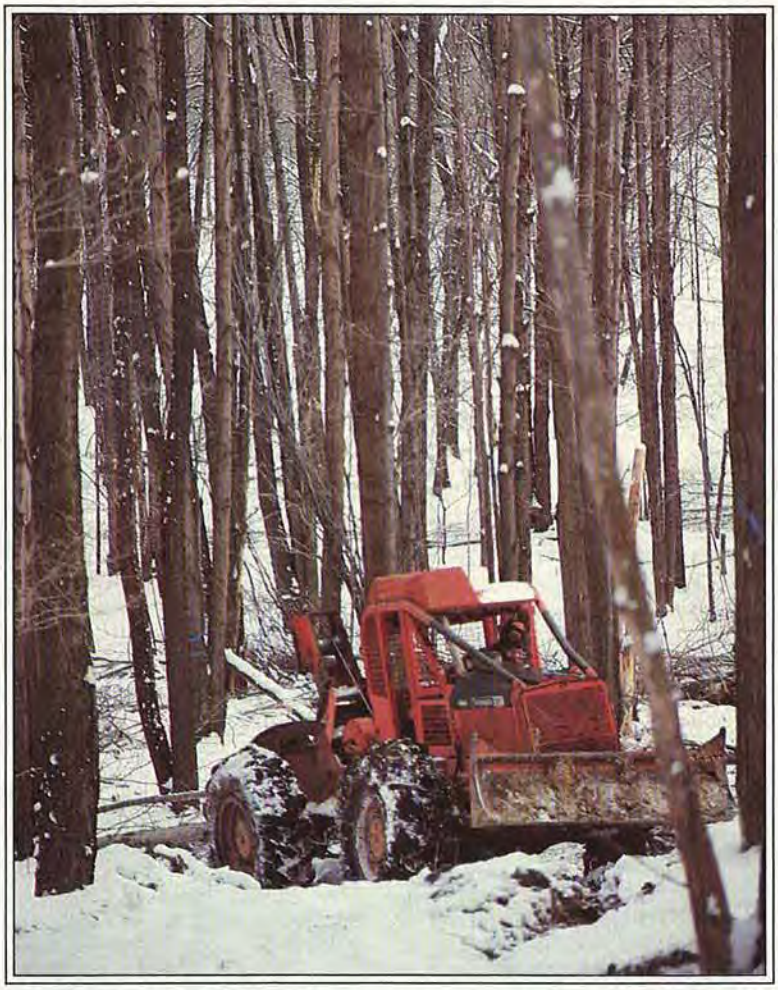
The 1,000-acre forest parcel (called a warrant in Pennsylvania) falls within Jonathan's 86-square mile district of responsibility. He has to call the shots that will hit tomorrow's target. "We started cutting here this winter. We've thinned with what we call a shelterwood cut rather than clearcut because enough of the trees weren't ready. We left most of the nice trees to grow some more." He points to some tall, but still small-diameter cherry. "We took a few ripe tomatoes, and weeded."

Poking through the snow, the twig-thin and kneecap-high cherry seedlings of advance regeneration appear frail and vulnerable. Commenting on them, Jonathan says, "If we had regeneration that was head-high—beyond the reach of deer—we would have had to decide whether or not to clearcut it. I didn't think we had enough of that yet. Rather, we needed to encourage seedlings by opening up the stand by thinning."

Indicating the slash piles made up of limbs cut from the downed timber, Jonathan notes, " The slash covers the seedlings and protects them from browsing."

In perhaps 10 years, logging crews will return to the stand and begin clearcutting the timber. "If' says Jonathan, "the cherry and other seedlings are tall enough and the trees have increased their diameter. It's an educated 'guess-and-by-golly' until everything turns right and you can cut and start the new stand over again."

Foresters such as Blaine, Jonathan, and Terry don't expect instant results or immediate satisfaction. The best they hope for is that sometime in the future another forester will walk where they've worked and say, "What a great forest." And in the Pennsylvania Alleghenies, that includes the hope that in the forest cherry will remain king.



▲ A skidder draws large ash, cherry, and sugar maple logs for lumber from the stand. Small beech and soft maple logs become paper pulp.

▲ The driver feeds the chain to secure his load. The cherry log at lower left bottom of the stack might contain about 800 board feet.

◀ Forester Jonathan Wirth measures a "ripe tomato" in his forest garden. Cherry trees need light to grow, so loggers thin the stand.

WHAT HAPPENS WHEN YOU HAVE TOO MANY DEER?

Not unlike livestock overgrazing to lay waste a grassland, the dining of too many deer can harm a forest. Following eight years of a continuing study of the effect of deer on the Allegheny Plateau forest, Dr. David Marquis has found that:

- *An overpopulation of deer eventually eliminates all their first-choice food, leaving only hardwood seedlings. When deer eat them, they alter the composition and growth of the future forest.*

Deer concentrating on seedlings for a meal potentially pose another problem. Because deer dislike fern, the plant spreads like wildfire when a forest is opened up, not allowing much else to grow.

- *Deer browsing influences the types of trees that will grow in a forest.* In an area with lots of deer, sugar maple, ash, and yellow poplar get eaten right away, leaving the second-choice cherry and the last-choice striped maple and beech. And because the cherry grows faster where there's sunlight, in some places it can dominate, creating a monoculture. The forest of cherry then becomes subject to outbreaks of disease and insects that could wipe it out.
- *Deer can't survive on cherry alone. In the 100 years it takes for a forest to develop, the deer herd could in fact eat themselves into a situation where they couldn't survive in what they created.*

Written by Peter J. Stephano
Photographs: Jim Kascoutas; deer, *above*, U.S. Forest Service
Illustration: Mike Henry

Print this article

A PROJECT THAT'S TALL, BRIGHT, AND HANDSOME

TORCHÈRE EXTRAORDINAIRE

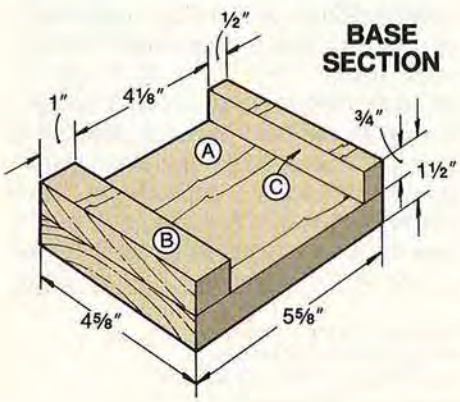
People in the home furnishings industry call an accessory like this a torchère, a French word meaning torch holder. Regardless of what you call it, we think you'll find this floor lamp a stunning addition to your home's decor. It's everything a dark, uninspiring corner always wanted.

Note: *You'll need some thin oak and walnut stock for this project. You can either resaw or plane thicker stock to the correct thickness. See the Buying Guide on page 62 for our source of electrical parts for the lamp.*

FIRST, BUILD THE BASE

1 Cut the base parts (A, B, C) to the sizes listed in the Bill of Materials on *top* of the opposite page. (If the dimensions in the Bill of Materials appear confusing, remember that we measure width across the grain and length with the grain.)

2 With the ends and edges flush, glue and clamp each of the eight base sections together, positioning the pieces where shown on the Base Section Drawing *below*. Later, scrape off the excess glue. (Part C is used only to support each base piece when it is miter-cut to shape. Part C is cut from each base section during the miter-cutting process.)



3 Attach a wood auxiliary fence to your miter gauge where shown in Step 1 of the drawing titled "Miter-Cutting the Base Sections." To keep the fence from getting cut in two when miter-cutting, make the fence at least 2" high. Angle the miter gauge 22½° from center. (See our miter-cutting shop tip on page 14 for help with setting the angle.)

Note: *Before cutting the eight base sections to shape as described in Step 4 below, we cut eight pieces of scrap hardboard the same size as part A (4⅝" × 5⅝"). Then, we test-cut the eight hardboard pieces using the setup shown in steps 1 and 2 on the drawing on the opposite page. Finally, we held the test-cut pieces together to check for gaps and verify the miter-gauge setting.*

4 Mark a centerline on one end of one base section (see Step 1 on the two-step drawing for location). Being careful to keep the clamp holding the stop out of the saw blade's path, align the blade with the marked line, set the stop, and cut the base sections to shape. Refer to the two-step drawing for details.

5 Using a ¼" round-over bit, rout each pie-shaped base section where shown on the Exploded-View Drawing. (We routed ours on a table-mounted router fitted with a fence.) Sand each base section.

6 Glue and "clamp" four of the sections together on a piece of plywood covered with waxed paper as

Continued

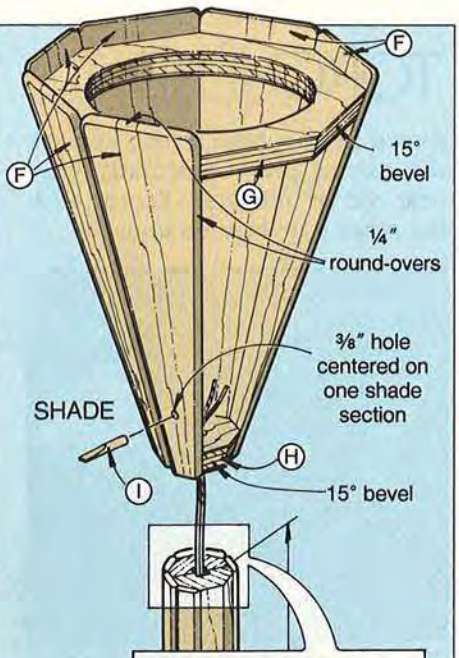
Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
BASE					
A	¾"	4⅝"	5⅝"	walnut	8
B	¾"	4⅝"	1"	walnut	8
C	¾"	4⅝"	½"	walnut	8
COLUMN					
D*	1½"	1½"	57"	walnut (laminated)	1
E*	¼"	⅝"	57"	walnut	8

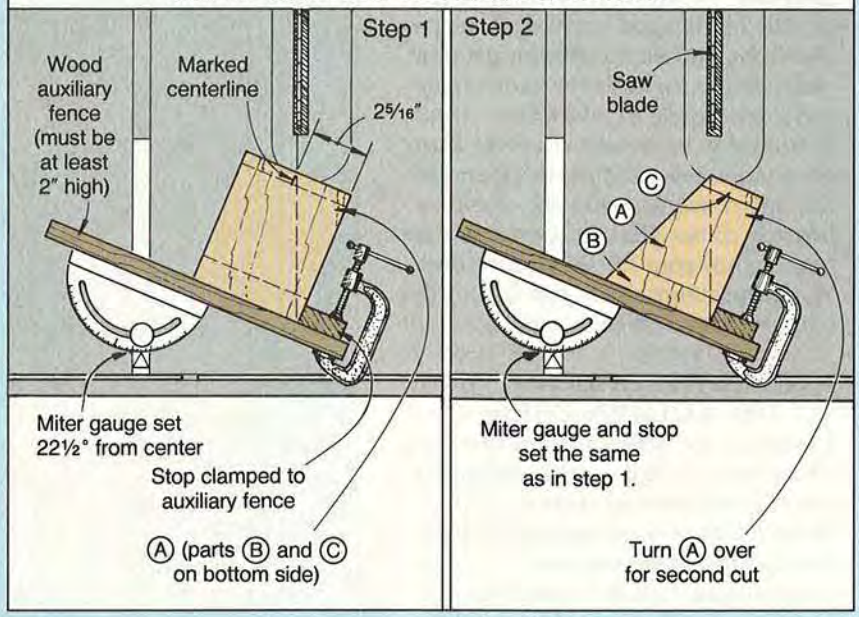
Part	Finished Size* T	W	L	Material	Qty.
SHADE					
F*	¼"	3¼"	12"	oak	8
G	¾"	7¼"	7¼"	plywood	1
H	¾"	1⅞"	1⅞"	plywood	1
I	¼" diameter		15⅝"	walnut dowel	1

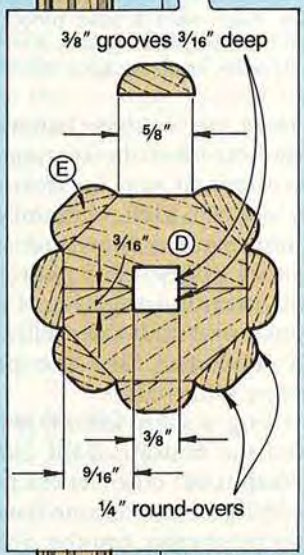
*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: #8×2" flathead wood screws, #8×1¼" flathead wood screws, #8×¾" flathead wood screws, epoxy, masking tape, aluminum foil, finish, three-way A lamp (30-70-100 watt).



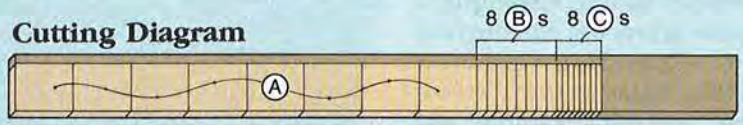
MITER–CUTTING THE BASE SECTIONS


Step 1
Step 2
Wood auxiliary fence (must be at least 2" high)
Marked centerline
2⅝16"
Saw blade
C
A
B
Miter gauge set 22½° from center
Stop clamped to auxiliary fence
A (parts B and C on bottom side)
Miter gauge and stop set the same as in step 1.
Turn A over for second cut

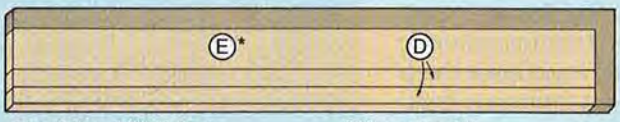


GROOVE DETAIL

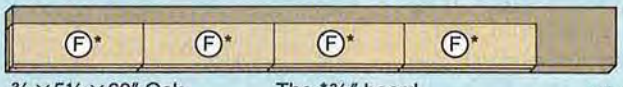
Cutting Diagram



¾×5½×72" Walnut

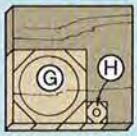


¾×9¼×60" Walnut *Planed to ⅝"

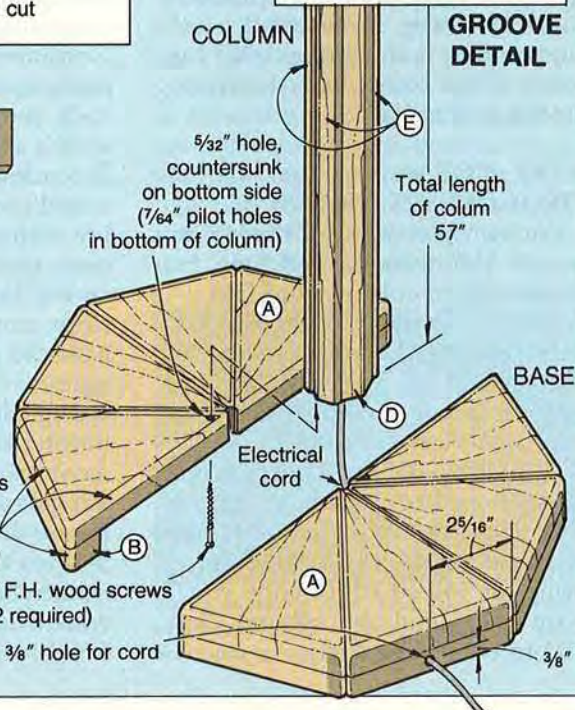


¾×5½×60" Oak

The *¾" board is resawed into two ¼" boards



¾×12×12" Plywood



shown in the photo *below*. Remove the excess glue, especially glue near the round-overs. Repeat with the other four base sections.

Glue four walnut base pieces together and hold in place against a straightedge with nails until the glue dries.

7 Hold the two base half-assemblies together; joint the mating edges if necessary. If you need to machine for a flush joint, remember to re-rout a round-over and sand the jointed edges. Glue and hold the half sections together (we positioned the half-assemblies on the plywood and held the pieces together with nails).

8 Using a sharp chisel, pry parts C from the bottom of the base.

9 Drill a ⅜" cord access hole, centered in the *end* of one base section where shown on the Exploded-View Drawing. Now, drill a ⅜" cord access hole through the *top center* of the base where shown on the same drawing.

NEXT, FORM THE COLUMN PIECES

1 Cut two pieces of ¾"-thick walnut to 1⅝" wide by 58" long for the laminated-column core (D).

2 Cut or rout a ⅜" groove 3/16" deep, centered along one face of each piece of walnut. (See the Groove Detail accompanying the Exploded-View Drawing.)

3 Glue and clamp the column pieces together groove to groove with the ends and edges flush. Later, scrape off the excess glue. Now, plane the joined edges only; you'll want the laminated column core (D) to be 1½" square.

4 Position your tablesaw rip fence, and tilt the blade where shown on the drawing at *right*. Bevel-rip each corner of the column core where shown on the drawing. Measure the width of all eight faces of the column core; you want each face to measure ⅝". Recut if necessary.

5 Cut a piece of ¾"-thick walnut to 4" wide by 58" long. Plane the piece to ⅝" thick. You want the board *thickness* to equal the *width* of each face (⅝") on the column core. (We reduced the thickness on our jointer; use a planer if you have one.) Position the fence on your tablesaw ¼" from the inside edge of the blade, and cut eight strips (E) from the walnut board, using a push stick for safety. Each strip should measure ¼×⅝×58".

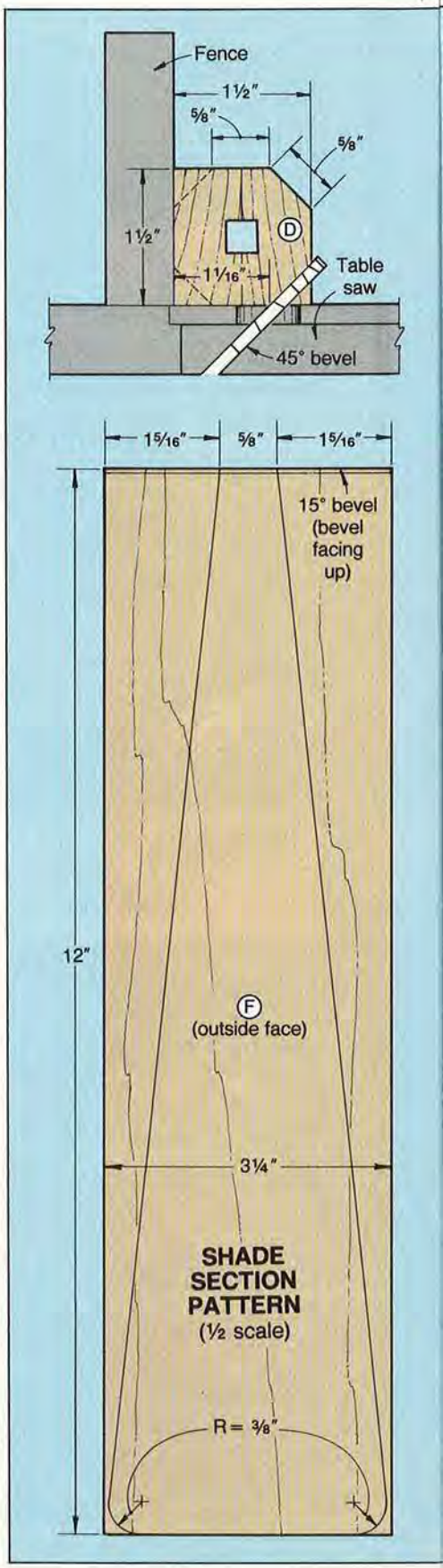
6 Chuck a ¼" round-over bit into your table-mounted router. Because the strips are too thin for the bit's bearing to be effective, position the fence and rout a ¼" round-over along the two outside faces of each strip. Finish-sand each strip.

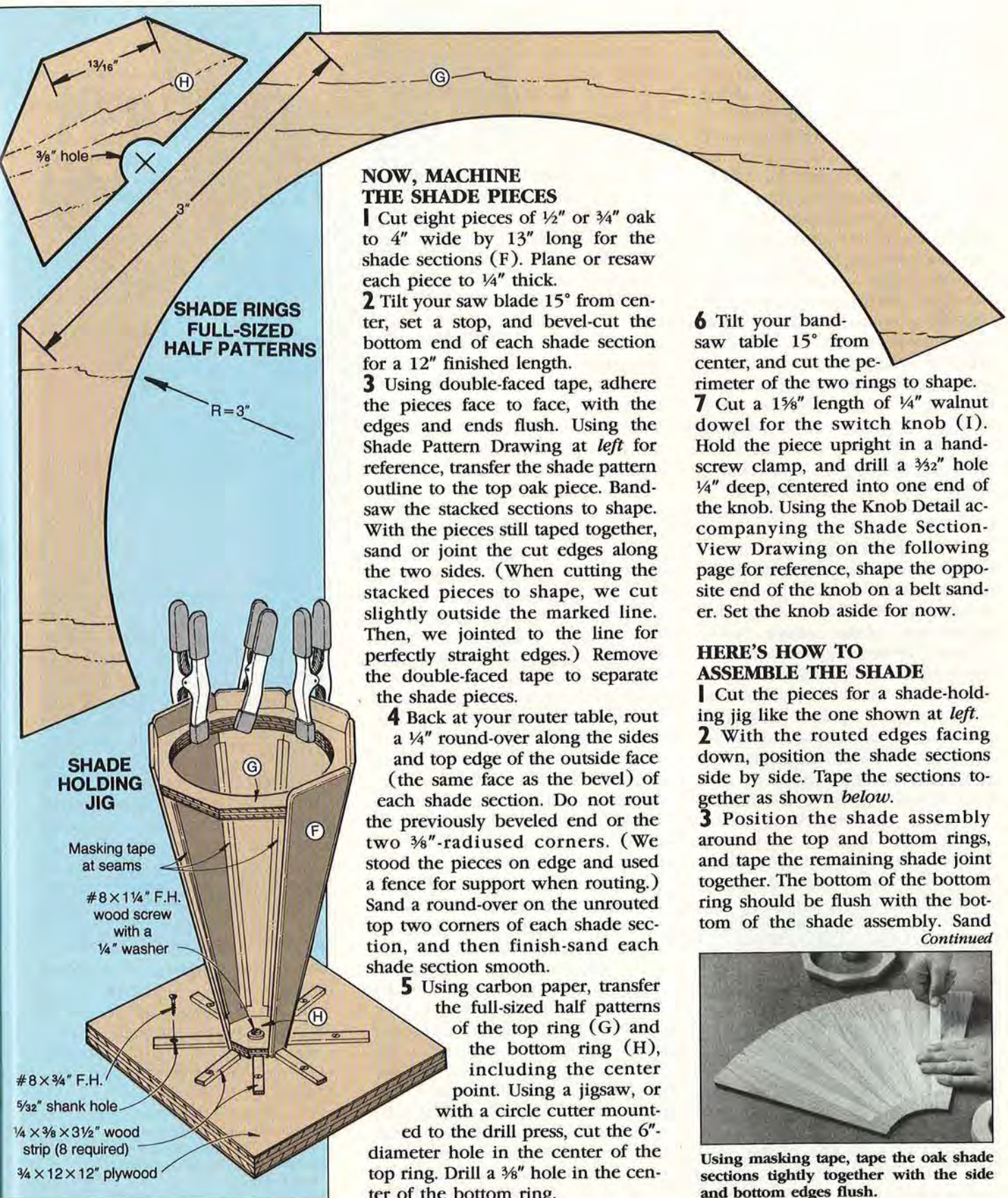
ATTACH THE STRIPS TO THE COLUMN CORE

1 Position the strips around the column core, holding the strips in place with several rubber bands. Wrap loops of masking tape around the column (we wrapped six loops around the column, spacing the loops about 8" apart). Moving in a straight line down the column, cut each loop of masking tape once with a utility knife.

2 Remove the rubber bands, and unroll the tambour-like strip assembly. Using a small brush, apply an even coat of glue to the column core (D). Wrap the taped-together strips around the column core and hold in place with several large rubber bands. (We used a few spring clamps to help hold some unruly strips firmly in place.) Remove the tape, and immediately wipe the excess glue from the crevices with a damp cloth.

3 After the glue dries, remove the rubber bands. Then, crosscut both ends of the column for a 57" finished length.





NOW, MACHINE THE SHADE PIECES

1 Cut eight pieces of ½" or ¾" oak to 4" wide by 13" long for the shade sections (F). Plane or resaw each piece to ¼" thick.

2 Tilt your saw blade 15° from center, set a stop, and bevel-cut the bottom end of each shade section for a 12" finished length.

3 Using double-faced tape, adhere the pieces face to face, with the edges and ends flush. Using the Shade Pattern Drawing at *left* for reference, transfer the shade pattern outline to the top oak piece. Bandsaw the stacked sections to shape. With the pieces still taped together, sand or joint the cut edges along the two sides. (When cutting the stacked pieces to shape, we cut slightly outside the marked line. Then, we jointed to the line for perfectly straight edges.) Remove the double-faced tape to separate the shade pieces.

4 Back at your router table, rout a ¼" round-over along the sides and top edge of the outside face (the same face as the bevel) of each shade section. Do not rout the previously beveled end or the two ⅜"-radiused corners. (We stood the pieces on edge and used a fence for support when routing.) Sand a round-over on the unrouted top two corners of each shade section, and then finish-sand each shade section smooth.

5 Using carbon paper, transfer the full-sized half patterns of the top ring (G) and the bottom ring (H), including the center point. Using a jigsaw, or with a circle cutter mounted to the drill press, cut the 6"-diameter hole in the center of the top ring. Drill a ⅜" hole in the center of the bottom ring.

6 Tilt your bandsaw table 15° from center, and cut the perimeter of the two rings to shape.

7 Cut a 1⅝" length of ¼" walnut dowel for the switch knob (I). Hold the piece upright in a handscrew clamp, and drill a 3/32" hole ¼" deep, centered into one end of the knob. Using the Knob Detail accompanying the Shade Section-View Drawing on the following page for reference, shape the opposite end of the knob on a belt sander. Set the knob aside for now.

HERE'S HOW TO ASSEMBLE THE SHADE

1 Cut the pieces for a shade-holding jig like the one shown at *left*.

2 With the routed edges facing down, position the shade sections side by side. Tape the sections together as shown *below*.

3 Position the shade assembly around the top and bottom rings, and tape the remaining shade joint together. The bottom of the bottom ring should be flush with the bottom of the shade assembly. Sand

Continued

Using masking tape, tape the oak shade sections tightly together with the side and bottom edges flush.

TORCHÈRE

the beveled edges of the rings if necessary for a snug fit. (The rings shouldn't force the taped joints apart.) Remove the tape from the areas on the inside of the shade that mate with the shade rings.

4 Remove the rings from the shade interior, and screw the bottom ring to the holding jig. Apply glue or epoxy to the beveled edges of each ring. Position the shade assembly around the bottom ring and position the top ring in place where shown on the Shade Holding Jig Drawing on the previous page. While you hold the shade upright, have a helper screw the cleats in place to hold each section firmly against one beveled face of the bottom ring. Hold the top ring in place with spring clamps. After the glue dries, remove the cleats and remaining masking tape. Unscrew the small ring from the holding jig.

YOU'RE ALMOST TO THE FINISH LINE

1 To mount the column to the base, start by cutting a 5" length of ⅜" dowel. Stick the dowel 3" into the bottom end of the column. Now, stick the doweled end of the column into the ⅜" hole in the center of the base. From the bottom side of the base, drill a pair of shank and pilot holes. Then, screw and epoxy the column to the base, *checking that the column is square to the base*. Remove the ⅜" dowel before the epoxy sets. Immediately wipe off any excess epoxy.

2 Thread the brass socket cap onto the top end of the threaded nipple. (See the Shade Section Drawing *above right* for help with the electrical wiring terminology we're using.) Tighten the setscrew.

3 Thread the nipple assembly through the hole in the small ring (H) until the bottom of the socket cap rests on the top face of the small ring (H).

4 Place the shade assembly on top of the column. Thread the exposed end of the nipple into the square hole in the small ring of the column. Align the joints of the shade sections with those of the column. Sand the bottom of the shade and top of the column flush if necessary. Make a small reference mark for later realigning the shade to the column. Now, remove the shade from the column.

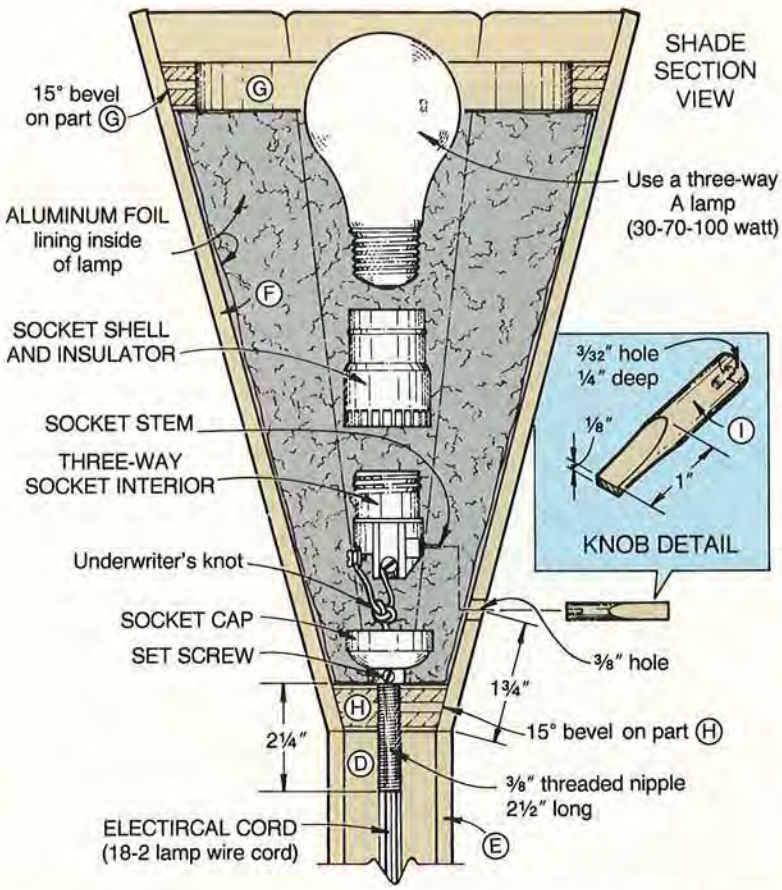
5 To join the shade to the column, apply epoxy to the bottom surface of the bottom ring and to the exposed portion of the threaded nipple. Position the shade on the column, realigning the joints and reference mark. Immediately remove any excess epoxy.

6 Finish-sand the entire project (don't forget to sand away the reference mark). Apply a clear finish to the lamp and switch knob.

7 Fish the cord down through the socket cap, column, and through the holes in the base. Split the top 3" of the cord, bare the ends, and tie an Underwriters knot above the socket cap. Wire the ends to the three-way socket. Push the socket into the socket cap. (To prevent the cord from doubling up in the column, you'll need to tug slightly on the bottom end of the cord when pushing the socket into the socket cap.) Attach a male end to the bottom end of the cord.

8 Carefully mark the knob-hole location on the outside of the shade assembly (see the Shade Section and Exploded-View drawings for location). With the lamp standing upright, hold your drill level with the floor, and drill a ⅜" hole for the switch knob (I).

9 Epoxy the switch knob onto the switch stem. Line the shade with aluminum foil. (The aluminum foil helps reflect light and radiate heat.) Install a three-way A lamp (30-70-100 watt).



BUYING GUIDE

• **Electrical supplies.** ⅜" threaded nipple 2½" long, light bulb socket with 3-way switch, 12' length of 18-2 lamp wire cord, male end for cord. $12.50 ppd. from Albright Lighting, 3029 Ingersoll Ave., Des Moines, IA 50312.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Hopkins Associates; Bob Calmer
Illustrations: Kim Downing; Bill Zaun

Print this article

PERFUME DECANTER

THE ESSENCE OF SUCCESS

Another in a collection of patterns from the nation's top woodturners

Myles Gilmer

Ten thousand lovers of perfume can't be wrong. That's how many of these stunning projects Myles Gilmer turned and sold before opening Gilmer Wood Company in Portland, Oregon. Now, this ambitious craftsman spends less time turning, and more time selling his prized stock to bowl-hungry turners.

To help you obtain these same results, Myles offers a kit containing the maple burl, ebony, glass vial, and perfume funnel necessary for making and using this project. Read the instructions starting below for Myles' turning technique.

FIRST, MAKE A SCRAP FACEPLATE

Myles starts by tracing the outline of his 3" metal faceplate onto a piece of 1"-thick stock. He cuts the piece round and screws the disc to his metal faceplate. After mounting the faceplate assembly to the lathe, Myles starts the lathe, and locates and marks the center of the wood disc by marking concentric circles. Then, he drills a ⅝" hole ¾" deep at the marked centerpoint. Next, he cuts a piece of ⅝" dowel stock 5¼" long, and glues it squarely into the hole in the disc where shown on the drawing *below* titled Set-Up for Turning the Cylinder.

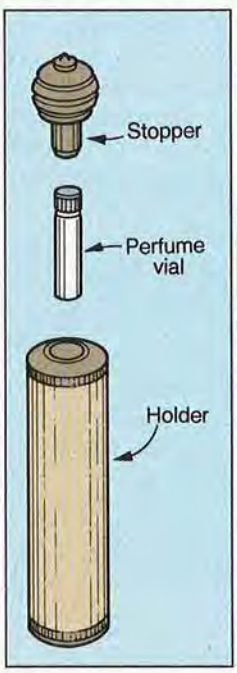
NEXT COMES THE CYLINDER

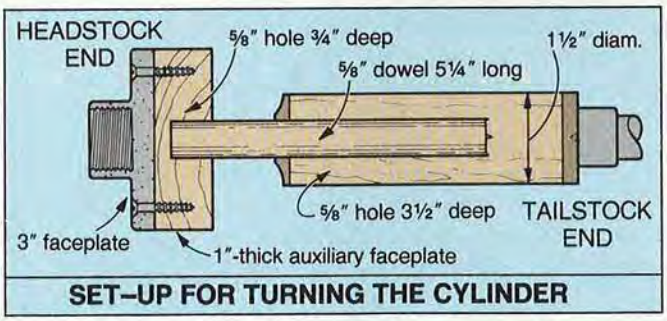
After cutting three pieces and laminating them together for the cylinder (the lamination measures 1⅝ × 1⅝ × 4⅜"), Myles moves to the drill press, and drills a ⅝" hole 3½" deep centered into one end of the lamination (see the Buying Guide for a predrilled lamination). Fitting the lamination over the protruding dowel and sliding the tailstock against the bottom of the lamination come next. Then, Myles turns the lamination to a 1½" diameter with a 1" gouge. After sanding the cylinder smooth, he stops the lathe, and slides away the tailstock.

SHAPE THE STOPPER

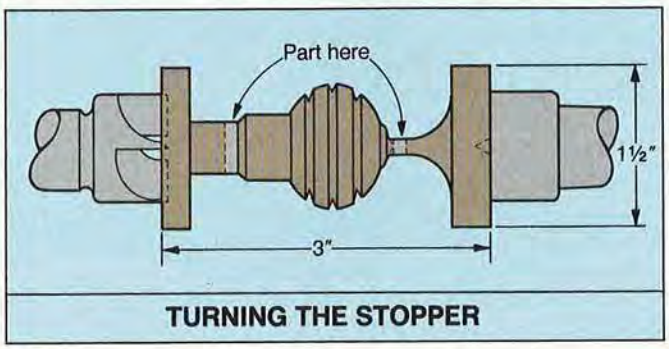
Myles cuts a block measuring 1½" square by 3" long for the stopper. After mounting it between centers where shown on the drawing *below*, and turning it round, he uses a ¼" parting tool to create the beads and a ¼" roundnose for the coves.

Continued on page 87





SET–UP FOR TURNING THE CYLINDER



TURNING THE STOPPER

POUND FOR POUND, THE MOST CUTTING POWER YOU CAN BUY

PORTABLE

Although often thought of as a contractor's tool, few machines can perform as many cutting jobs in the workshop as a portable circular saw. Among home woodworkers, only portable drills outsell these rugged machines.

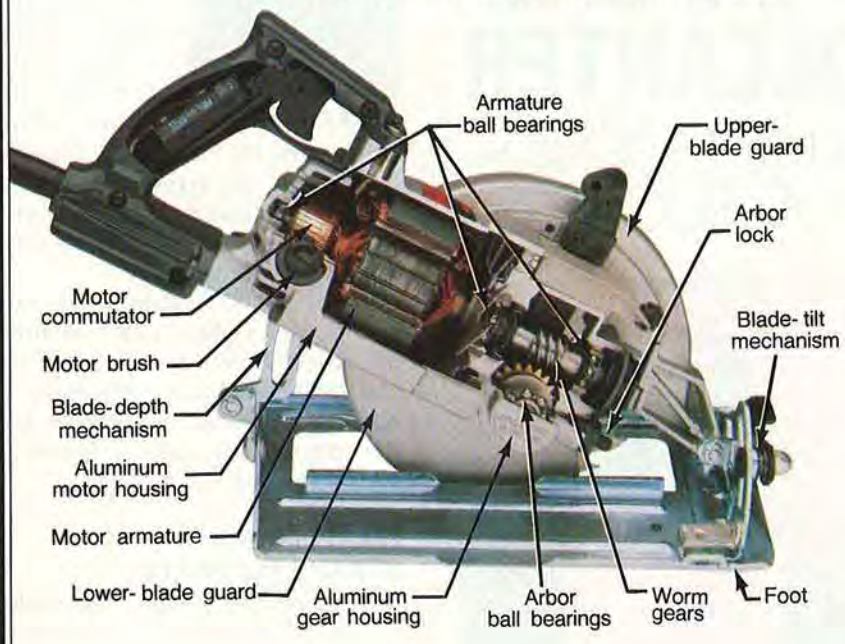
Mention the words "portable circular saw" and some woodworkers won't know what you're talking about. On the other hand, if you mention "Skilsaw," they'll probably think of the ever-popular models with 7¼" blades that dot the shelves of hardware and department stores from coast to coast. That's how much Skil Corporation, and 7¼" saws, have dominated this market for the past 50 years.

Today, Americans purchase more than 3 million of these units every year, making for some intense competition among foreign and domestic manufacturers. To earn their niche in this huge marketplace, companies make saws in more sizes, with more features, than ever before. To help you make sense of it all, we took a look at 20 machines ranging from small trimsaws weighing less than 6½ pounds, to 30-pound behemoths capable of slicing through 6" stock.

We discovered that the same reasons that make these kerf-crunchers a staple of the construction trade—fast cuts, portability, and rugged reliability—also make them great tools for the home workshop. In fact, there's no better tool for rough-cutting sheet goods, or anything else you can't conveniently bring to your tablesaw.

As *WOOD*® magazine Project Builder Jim Boelling puts it: "I find it much easier to work on a small piece of the pie, rather than the whole pie at once." What saw will best cut your "pies"? Stick around and we'll tell you.

ANATOMY OF A WORM-DRIVE SAW



BUY THE SIZE THAT FITS YOUR NEEDS

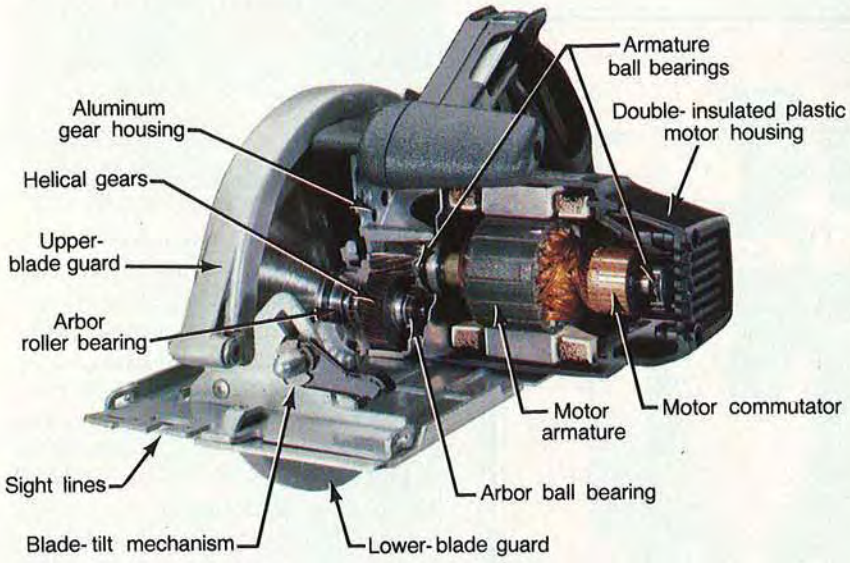
The size of a circular saw refers to the maximum diameter of blade it accepts. To choose the right size for your needs, first determine the thickest stock you normally cut. Then, refer to the chart on page 69 where we show you maximum cutting depths for various models. Since you'll have more control and less arm fatigue with a small saw, we suggest you buy the circular saw that's big enough for your needs, and no larger.

Although 7¼" saws hold between 80 and 90 percent of the market share according to manufacturers, a smaller saw may suit your needs. Why? The reason lies in the difference in size between 2×4 dimensional lumber of the 1930s and today. During the Thirties, 2×4s actually measured 2×4". To meet the requirements of homebuilders who needed a saw capable of making a 45° cut through 2" stock, Skil developed the model 77, whose 7¼" blade could make such a cut. The 7¼" saws gained in popularity through the home-building booms of the 1940s and have since become the standard.

Today, lumber mills turn out 1½×3½" 2×4s, requiring only a saw such as the 6" Porter-Cable model 345 to make a 45° cut. The advantage? This saw weighs about 3 pounds less than most 7¼" saws. And it's the only saw that has two great optional items for the home workshop: a dust bag and a vacuum hose.

CIRCULAR SAWS

ANATOMY OF A HELICAL-GEAR SAW



WORM DRIVE OR HELICAL GEAR—WHAT'S FOR YOU?

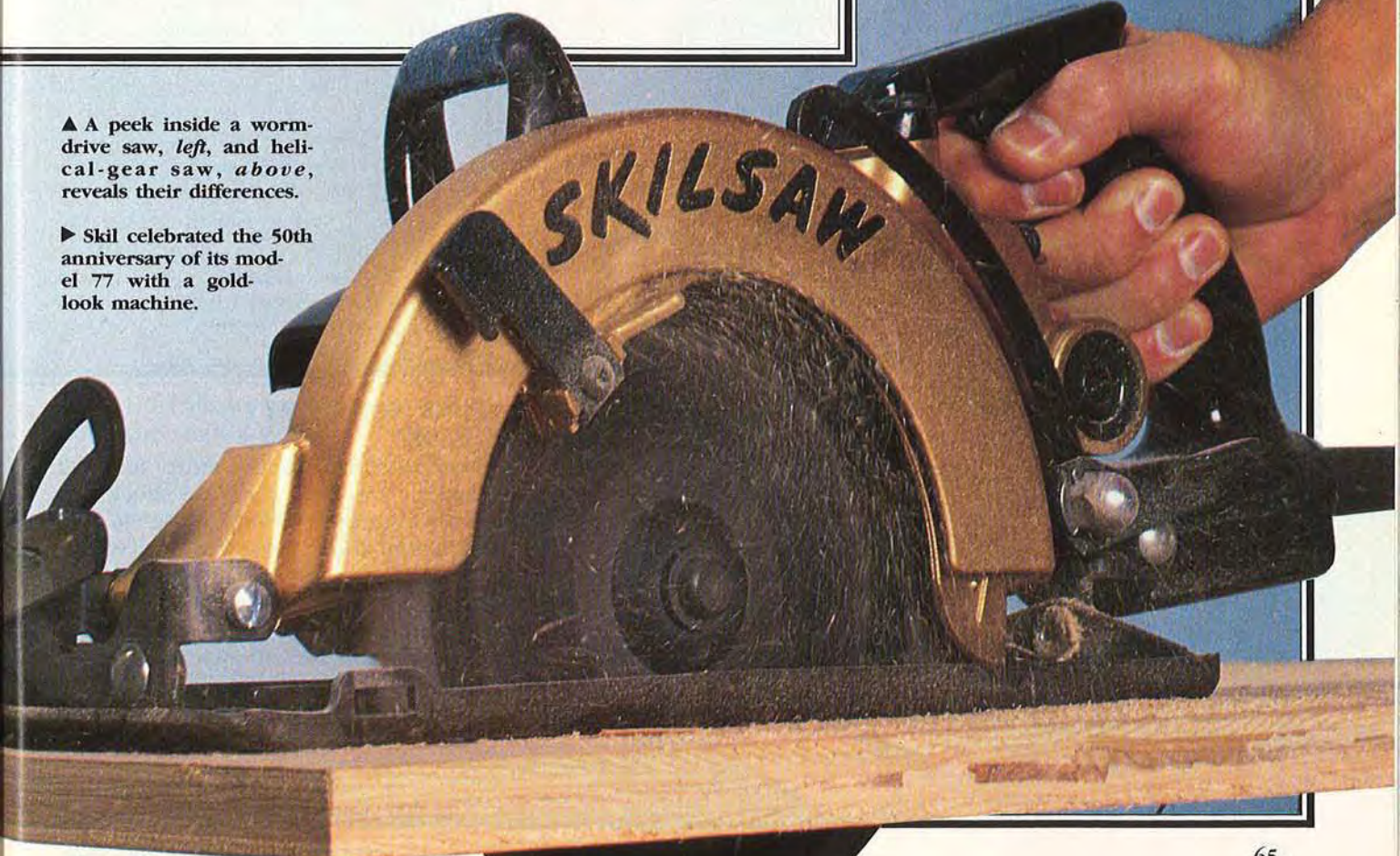
When most of us think of a portable circular saw, we envision the saw that engineers refer to as a helical-gear model such as the one shown at *left*. But another gearing choice presents itself when you buy a portable circular saw: worm drive (see machine at *far left*). Gearing may sound like a purely mechanical point, but it makes a world of difference in the torque, size, use, and price of the tool.

Although helical-gear saws command most of the consumer market, they're also sold to people in the construction trades. On the other hand, worm-drive saws find their way into the hands of contractors, but few homeowners. Nevertheless, we think worm-drive saws make a good choice for some home woodworkers.

Continued

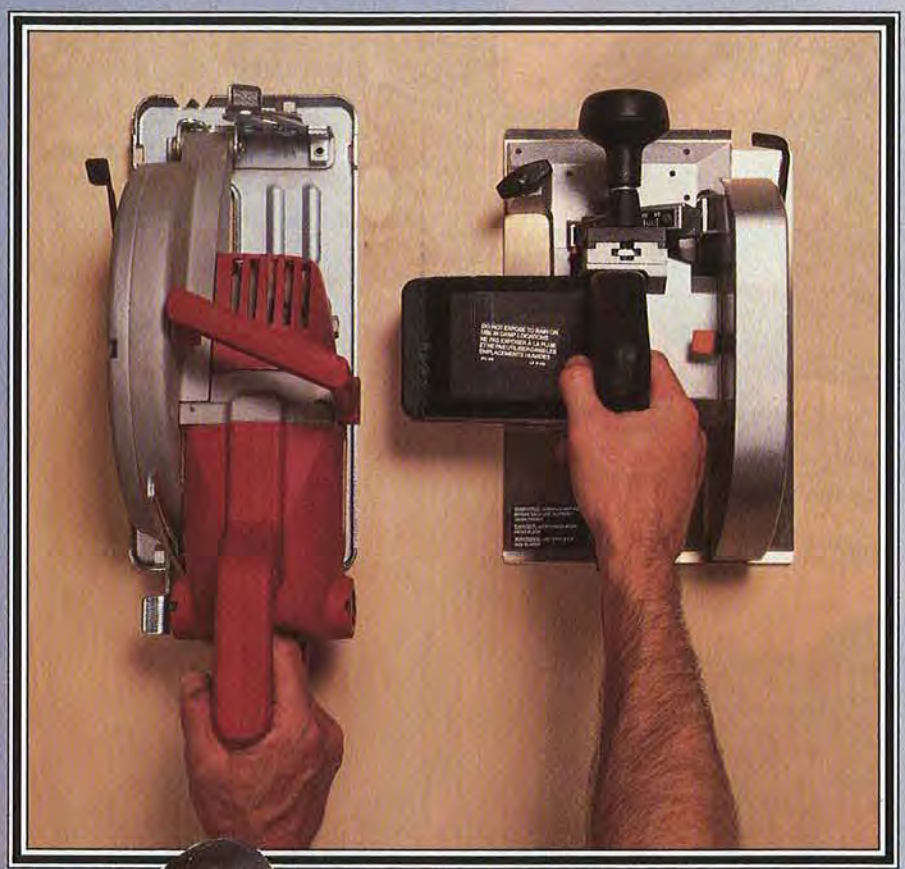
▲ A peek inside a worm-drive saw, *left*, and helical-gear saw, *above*, reveals their differences.

▶ Skil celebrated the 50th anniversary of its model 77 with a gold-look machine.



PORTABLE CIRCULAR SAWS

Because it's geared lower, a worm-drive saw's blade turns slower and develops much more torque than its helical-gear brother, making it less likely to bog down during a cut. Also, the thin-bodied worm-drive saw can cut in tighter quarters. Because of the distance between its blade and handle, you can reach about 6" farther across a cutting surface. Finally, with your hand more directly behind the blade, you maintain greater control over the direction of the blade with a worm-drive than with a helical-gear machine as shown *below*.



▲ A worm-drive saw, such as Milwaukee's 8¼"model 6378 at *left*, extends your reach over a helical gear saw such as the AEG 8¼" model PC 80-1.

AEG model PC 80-1. ▼

On the other hand, worm-drive saws weigh and cost about 50 percent more, and their oil-filled gear casings need occasional fill-ups. The Makita hypoid saw, that has the appearance and low torque of a worm-drive machine, doesn't need this maintenance. In place of worm gears, the hypoid has two cone-shaped gears that turn at right angles to one another. We found it has all the power of worm drive saws while weighing about 2½ pounds less.

Despite the poundage and priciness of worm drives, several contractors told us, in passionate terms, they would never use anything else. Our advice: A helical-gear saw will handle nearly any home workshop job you can throw at it. But if you have a major construction project in your future, such as an addition to your house, a worm-drive model may pay off (if you can handle its 16-plus pounds).

Finally, all worm-drive saws are left-handed, meaning the blade is on the left side of the tool from the operator's perspective. Some of the smaller helical gear saws (6" and below) have blades on the left side, but all the larger models are right-handed. Many right-handed woodworkers prefer the left-handed saws because they like to keep an eye on the blade without leaning over the machine. Our recommendation: Try any saw before you buy it and choose the model that's most comfortable for you.

WE'D RATHER BUY SAFETY THAN BE SORRY

All the saws we tested had safety features that will adequately protect you from electrical shock and the machine's powerfully turning blade. In any machine, you'll find these three main safety features: upper- and lower-blade guards, safety switches, and electrical insulation and/or grounding.

The saw's upper-blade guard covers the top half of the blade and remains fixed. The lower-blade guard protects the bottom

▲ The position of your hand changes from a deep cut to a shallow cut with a pivot-foot saw, such as Black & Decker's model 2680, changing your sense of balance for each cut.

▲ With a drop-foot saw, such as Bosch's model 1651, you can cut at various blade depths without changing your balance. The reason: The vertical alignment of your hand stays the same.

DEPTH ADJUSTMENT: WE LIKE DROP FOOTS

If you're getting the feeling that there's a lot more to circular saws than just a blade, handle, and motor, then stay with us because you also have two depth-adjustment options: *pivot foot* or *drop foot*. All worm-drive saws, as well as most helical-gear models, have pivot-foot mechanisms that lower the blade in an arching motion. The mechanism consists of a hinge near the front of the machine, and a depth lock near the rear of the tool. Drop foots, available on more-expensive helical gear models, consist of a mechanism near the front of the saw that allows you to lower the blade in a straight, vertical motion.

As shown *below left*, the handle of a drop-foot saw remains in the same vertical plane no matter what the depth of the blade, giving you consistent balance in all cuts. When raising a pivot foot saw blade, as shown *above left*, your hand position changes from being behind the blade to being above it. This change gives you a different sense of balance when you switch from making a shallow cut through plywood for example, to a deep cut through a 2×4. Although worm-drives have pivot foots, your hand remains well-behind the blade in deep and shallow cuts, thus affecting your balance very little.

Drop-foot models have two more advantages. First, when you tilt a drop-foot saw's blade from 90° to 45°, the blade maintains the same sight line, just as the blade does on a tablesaw. Pivot-foot saws have two sight lines, about ½" apart, for 90° and 45° cuts; it's anybody's guess where the blade will fall for cuts between those two lines. Secondly, many drop-foot mechanisms have index marks that make easy work of pre-setting a blade's depth.

LET'S SEE WHAT THESE SAWS ARE MADE OF

As with most power tools, there's a lot more to portable circular saws than meets the eye. Before buying, consider the construction materials of both the bearings and foot (the metal plate that the saw rides on).

Bearings, found on the motor armature and arbor of circular saws, protect these components from damaging friction. The bearings will probably wear out before any other mechanical part.

Ball bearings, made of small metal balls within a cage, and roller bearings, consisting of cylindrical rollers, will last a long time while giving friction protection to the armature and arbor. On the other hand, sleeve bearings, found mostly on inexpensive saws, offer little protection. Because they consist of metal cylinders with no moving parts, anything turning within them creates excessive friction.

Finally, a saw needs a good foot to stand on. You can test the foot by picking the saw up in one hand

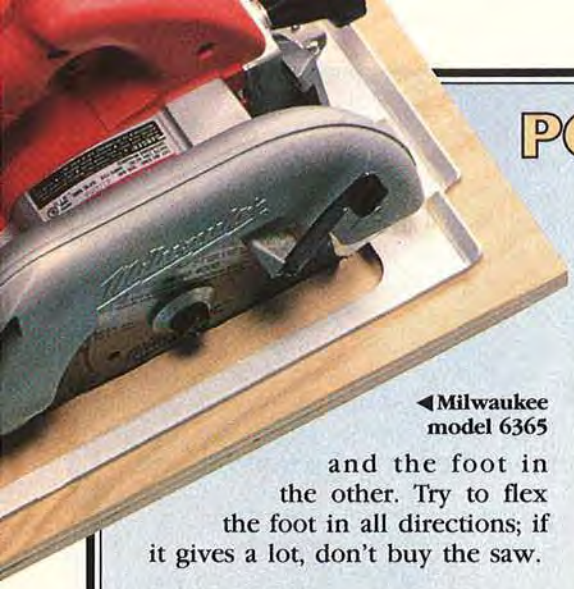
Continued

half of the blade, but swings out of the way when you start cutting. When you withdraw the saw, a spring quickly brings the guard over the blade. Before you buy any circular saw, test the lower guard by making a compound cut. Do this by setting the blade at a 45° tilt and cutting at an angle to the edge of a piece of stock. The lower guard should retract smoothly. In our tests, all the blade guards retracted satisfactorily, but the Bosch 1651 was the smoothest of the 7¼" models. We had to help the Sears model 109250 by pulling on its blade retractor.

Among the 20 saws we looked at, about half had safety-switch devices that require you to push a button before squeezing the switch. These switches seem like a great idea to us, especially for occasional users of a circular saw. Manufacturers told us they leave safety switches off some of their high-end models because time-conscious professional users don't want to bother with them.

To protect you against electrical shock, saws either have 3-prong grounded cords, double insulation (two layers of insulation around electrical conducting elements), or both. For maximum safety, we suggest you buy a saw with both forms of protection.

PORTABLE CIRCULAR SAWS



◀Milwaukee model 6365

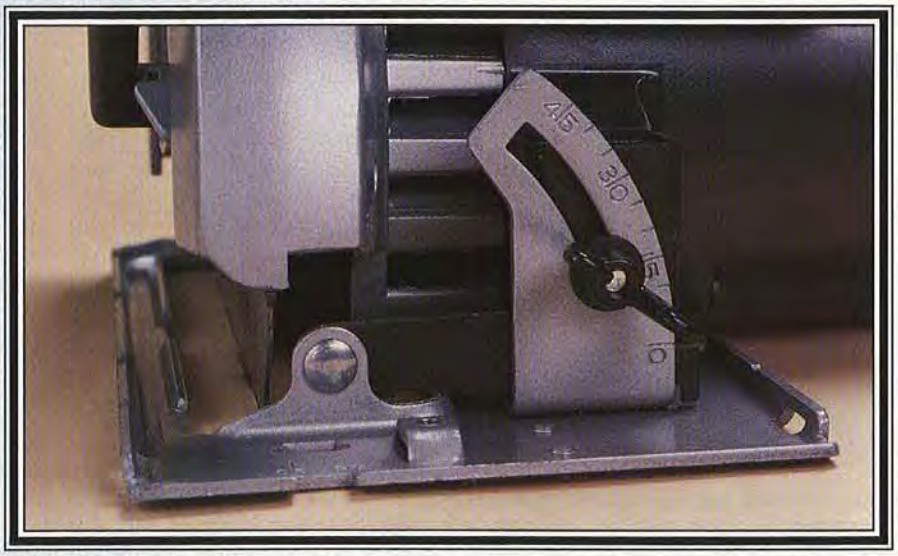
and the foot in the other. Try to flex the foot in all directions; if it gives a lot, don't buy the saw.

SOME BLADES CHANGE MORE QUICKLY

We like the saws that allow you to change blades by pushing a button to lock the saw's arbor while you use a wrench to loosen the nut covering the blade. To remove the blade on a saw without an arbor lock—a much clumsier task—you first pin the blade against a piece of wood, and then loosen the blade's locking nut with a wrench.

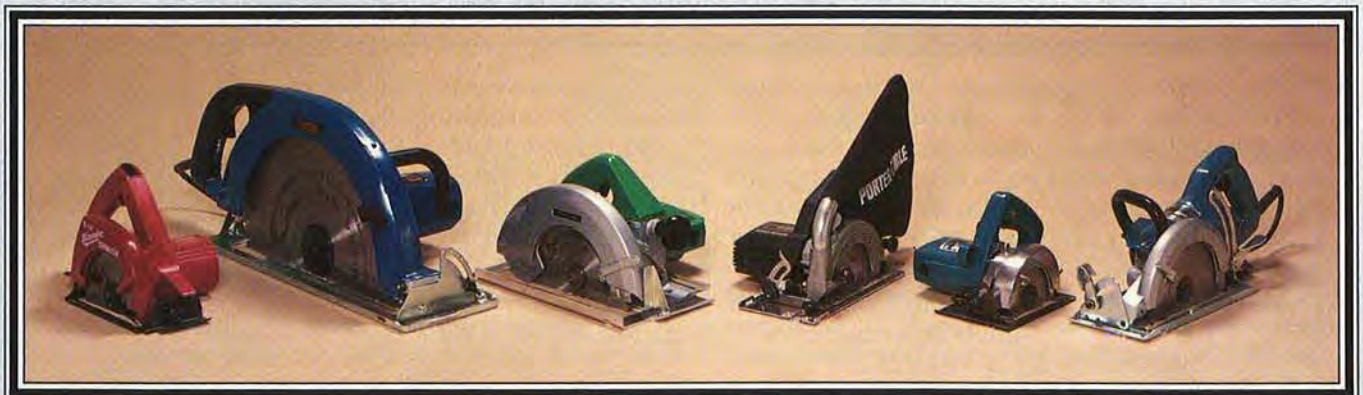
GO CORDLESS ONLY IF YOU HAVE TO

Most cordless tools will perform nearly as well as their AC-powered relatives, but battery-powered circular saws don't come close to matching the power of plug-in models. They're also expensive (about $250 list). However, you'll find one of these go-anywhere tools useful if you do a lot of work in damp conditions, such as a boat, or at remote locations.



▲ A look at the Black & Decker model 3028 *above* ($125 list) and model 2680 *below* ($180 list) shows what added quality you get for a few extra dollars. The 3028 has a 3/16"-thick stamped-steel shoe and a wingnut-adjusted tilt mechanism.

▲ Compared with its less-expensive counterpart, the 2680 has a sturdy ⅛"-thick extruded-aluminum shoe. Likewise, the heavier tilt mechanism on the 2680 will hold the saw steady, and its tilt lever locks with one quick, easy motion.



▲ Portable circular saws come in a shape, size, and variety to meet nearly any need you can imagine. Shown from the left: Milwaukee's battery-powered 6¼" model 6305, Ryobi's 16¼" model W-201S, Hitachi's 9¼" model PSM-9, Porter-Cable's 6" model 345 Saw Boss, Makita's 4⅜" model 4200 N, and Makita's 7¼" hypoid-drive model 5077 B.

Written by Bill Krier Technical consultant: George Granseth Photographs: Jim Kascoutas

CUTTING FACTS ABOUT PORTABLE CIRCULAR SAWS

	MODEL NO.	BLADE SIZE (DIAMETER, INCHES)	MAXIMUM CUTTING DEPTH (INCHES)		FOOT TYPE[1]	AMPS	MOTOR/ DRIVE ASSEMBLY					SERVICEABLE BRUSHES (INCHES UNLESS MARKED OTHERWISE)	DOUBLE INSULATED	SAFETY		CONST.[6] MATERIALS			BEARINGS[7]		COUNTRY OF ORIGIN	NET WEIGHT (POUNDS)	SUGGESTED LIST PRICE[9]
			BLADE AT 90°	BLADE AT 45°			NO-LOAD SPEED (RPM)[2]	DRIVE[3]	BRAKE[4]	ARBOR LOCK	ARBOR SIZE[5]			SAFETY SWITCH	MOTOR HOUSING	FOOT	ARMATURE	ARBOR	BLADE POSITION[8]			
AEG	PC 80-1*	8¼	3	2¼	D	20	6,400	HG	N	Y	⅝	N	Y	N	GN	A	B	B	RH	WEST GERMANY	12.5	234
BLACK & DECKER	3051*	7¼	2 1/32	1 15/16	P	13.0	4,300	WD	N	Y	D	Y	N	N	CA	S	B	B	LH	ITALY	16.5	246
	3028	7¼	2 7/16	1⅜	P	12.0	5,800	HG	N	N	⅝	N	N	N	P	S	B	R-R	RH	USA	10.7	125
	2680	7¼	2¼	1 25/32	P	13.0	5,800	HG	N	Y	⅝	Y	N	N	GN	A	B	B-R	RH	USA	11.2	180
BOSCH	1651	7¼	2 7/16	1 15/16	D	13.0	5,500	HG	N	N	⅝	Y	Y	N	GN	A	B	B-R	RH	USA	12.9	179
	1654	7¼	2 7/16	2	P	13.0	5,800	HG	N	Y	⅝	Y	Y	N	GN	A	B	B-R	RH	USA	10.9	179
HITACHI	PSM-9	9¼	3⅜	2½	P	14.6	5,000	HG	N	Y	⅝	Y	Y	Y	P	A	B	B	RH	JAPAN	15.4	383
MAKITA	4200N	4⅜	1¼	⅞	P	7.5	11,000	HG	N	N	20mm	Y	Y	Y	P	S	B	B	LH	JAPAN	6.2	210
	5007NBA*	7¼	2⅜	1¾	P	13.0	5,800	HG	E	Y	⅝	Y	Y	N	P	A	B	B	RH	JAPAN	11.0	219
	5077B	7¼	2⅜	1⅞	P	13.0	4,300	HY	E	Y	⅝	Y	Y	N	P	S	B	B	LH	JAPAN	13.9	254
	5201NA	10¼	3¾	2½	P	12.0	3,700	HG	E	N	⅝	Y	N	Y	CA	S	B	B	RH	JAPAN	18.3	509
METABO	CS725	7¼	2 7/16	1 23/32	D	13.0	5,800	HG	N	N	⅝	Y	Y	N	P	A	B	B-R	RH	USA	11.5	200
MILWAUKEE	6365*	7¼	2⅜	1 25/32	D	13.0	5,800	HG	N	Y	⅝	Y	N	N	GN	A	B	B-R	RH	USA	11.5	189
	6460	10¼	3 15/16	2⅞	D	15.0	5,200	HG	N	N	¾	Y	N	N	GN	S	B	B-R	RH	USA	19.5	395
	6378*	8¼	2⅝	2¼	P	15.0	4,400	WD	N	N	D	Y	N	N	GN	S	B	B-R	LH	USA	17.2	296
	6305	6¼	2 3/16	1 7/16	P	B	3,400	HG	N	N	20mm	N	N	Y	P	A	S	B-S	RH	JAPAN	8.0	284
PORTER-CABLE	345	6	1 15/16	1 9/16	P	9.0	8,000	HG	N	Y	½	Y	Y	N	GN	S	B	B-R	LH	USA	8.0	155
	315-1*	7¼	2 7/16	1 23/32	D	13.0	5,800	HG	N	N	⅝	N	Y	N	GP	A	B	B-	RH	USA	11.5	178
	314	4½	1 5/16	1 1/16	P	4.5	4,500	WD	N	N	⅜	Y	N	N	CA	S	B	B	RH	USA	7.0	185
RYOBI	W-620	7¼	2 7/16	1 23/32	D	13.0	5,500	HG	N	Y	⅝	Y	Y	N	P	S	B	B+S	RH	JAPAN	11.0	187
	W-201S**	16¼	6 7/16	4⅜	D	12.0	2,500	HG	E	Y	1	Y	N	N	P	S	B	B	RH	JAPAN	30.8	602
SEARS	109250	7¼	2¼	1¾	P	12.0	5,000	HG	N	Y	⅝	N	Y	Y	TP	S	B	B-R	RH	USA	13.8	75
SKIL	77*	7¼	2⅜	1 15/16	P	13.0	4,400	WD	N	Y	D	Y	N	N	CA	S	B	B	LH	USA	16.3	259
	5656	7¼	2 7/16	1⅞	P	13.0	5,400	HG	N	Y	⅝	Y	Y	N	GN	S	B	B-R	RH	USA	11.7	172
	5510	5½	1¾	1 5/16	P	6.5	4,000	HG	N	N	½	Y	Y	N	GN	S	B	B-R	LH	USA	6.5	137
	5250	7¼	2 7/16	1 15/16	P	10.0	4,600	HG	N	N	⅝	Y	Y	Y	GN	S	B-S	S-S	RH	USA	11.0	69

(*) Similar machines available in both 7¼" and 8¼" sizes
(**) Makita makes a similar machine
(Y) Yes; (N) No

1. (D) Drop foot; (P) Pivot Foot
2. No-load speed determined when machine turns free (not cutting)
3. (HG) Helical gear; (WD) Worm drive; (HY) Hypoid
4. (N) None; (E) Electric brake
5. (D) ⅝" arbor with diamond knock-out
6. (A) Aluminum; (CA) Cast aluminum; (GN) Glass-filled nylon; (GP) Glass-filled polyester; (P) Polycarbonate plastic; (S) Steel; (TP) Thermo-set plastic
7. (B) Ball bearing; (R) Roller bearing; (S) Sleeve bearing
8. (RH) Righthand; (LH) Lefthand
9. Tools often discounted 10-30% below list

MANUFACTURER'S LISTING:

AEG Power Tool Corp.
Three Shaw's Cove
New London, CT 06320
800/243-0870

Black & Decker
P.O. Box 857
Hampstead, MD 21074
301/239-5300

Robert Bosch Power Tool Corp.
3701 Neuse Blvd.
New Bern, NC 28560
800/334-4151

Hitachi Power Tools U.S.A Ltd.
4487-E Park Drive
Norcross, GA 30093
404/925-1774

Makita U.S.A. Inc.
12950 E. Alondra Blvd.
Cerritos, CA 90701
714/522-8088

Metabo Corporation.
1231 Wilson Drive
Westchester, PA 19380
215/436-5900

Milwaukee Electric
Tool Corporation
13135 West Lisbon Road
Brookfield, WI 53005
414/781-3600

Porter-Cable Corp.
Highway 45 at Young's Crossing
Jackson, TN 38305
901/668-8600

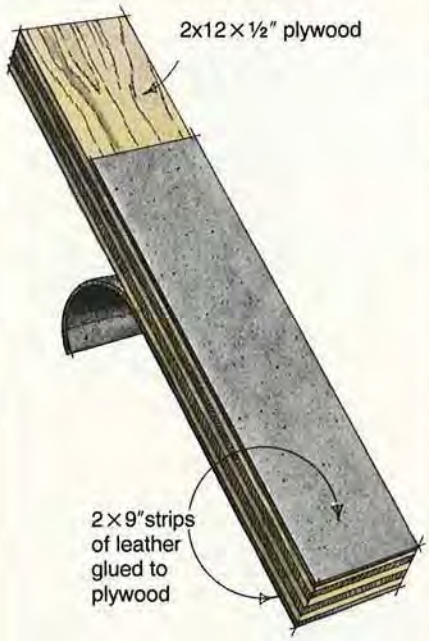
Ryobi America Corp.
1158 Tower Lane
Bensenville, IL 60106
312/250-7999

Sears, Roebuck & Co.
For more information,
contact your nearest store.

Skil Corporation
4801 West Peterson Ave.
Chicago, IL 60646
312/286-7330

PUT A SUPER FINE EDGE ON YOUR CARVING TOOLS

Nothing raises the frustration level of a beginning carver more than using dull tools, which make carving dangerous as well as difficult. Carving, however, can be safe and enjoyable if you know how to use the one tool that carvers always keep at arms length—the leather strop.



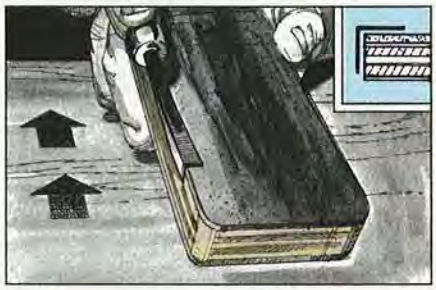
1 You can buy a variety of strops, in prices from $15 to $40, but after talking with some prominent carvers, we're convinced that all you need is an easy-to-make two-sided leather strop and two different pastes. You can buy coarse (emery), and medium (tripoli) pastes from the source in the Buying Guide at the end of this article.

To make a strop like the one shown *above*, cut a 2×12" piece of ½" plywood, then glue 2×9" strips of belt leather (available from the Buying Guide source) to both sides of the plywood. Attach the leather strips to the same end of the plywood stick to leave a 3" handle at the other end.

2 Now, apply coarse paste to one of the leather strips, and medium paste to the other strip. To sharpen a bench knife, hold the strop (coarse side up) in one hand, and the knife, with its sharp edge facing away from you, in your other hand. Set the blade onto the far end of the strop, with the back edge of the tool just off the leather surface as shown *above*. Press down on the knife and pull it toward you. Now, stroke the opposite side of the blade back down the strop and repeat this step 10–12 times. Then, repeat this process on the medium compound.

3 To sharpen a gouge, hold one end of the tool's edge against the coarse surface of the strop as shown *above*. As you pull the gouge toward you, roll it so all of the cutting edge makes contact with the strop during one stroke. Repeat this stroke 10–12 times. Always pull the gouge toward you—pushing the sharp edge into the leather will cut the strop. Then, flip over the strop and repeat this process on its medium side.

4 Sharpen a V-tool by first stroking one side of the V, then the other on the coarse compound. Next, lay the point of the V on the strop as shown *above*, and pull the tool toward you 5–6 times. Repeat this process on the medium compound.



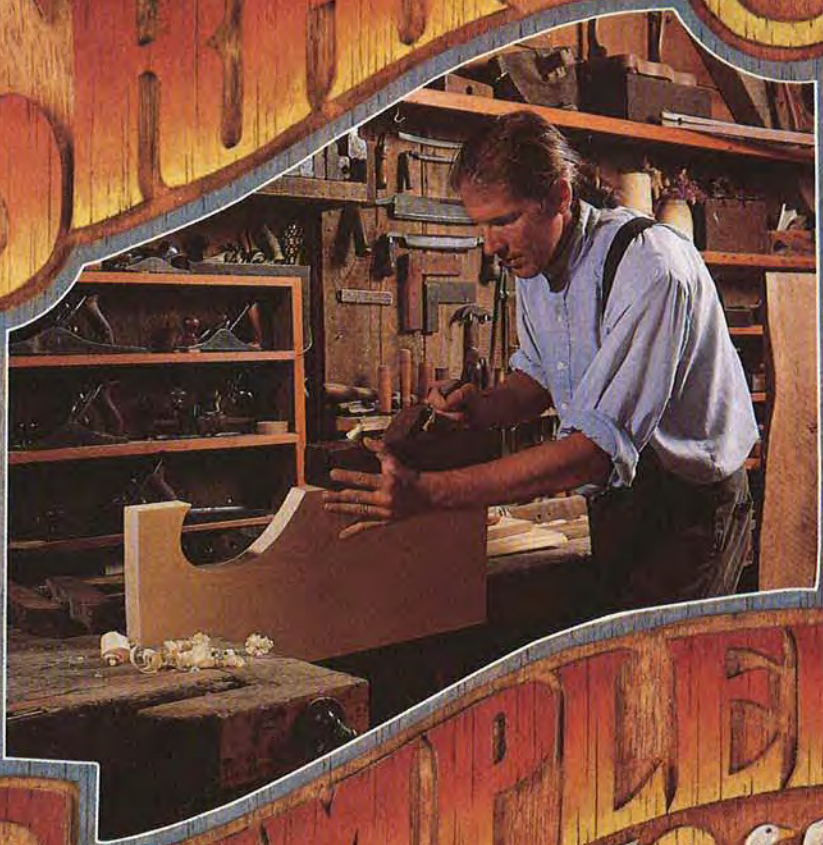
5 Stropping will form a microscopic burr on the unbeveled (or inside) edge of both the gouge and V-tool. Remove the burr by placing the unbeveled edge of the tool along the corner of the strop as shown *above*. Then, pull the tool toward you 3 times and repeat this process on the other side of the strop.

BUYING GUIDE

- ***Belt leather.*** 36×2" strip, item No. 4534, $7.95 ppd. from Tandy Leather Co., PO Box 2934, Dept. WO289, Fort Worth, TX 76101.
- ***Emery compound.*** Item No. 07M03, $11.50 ppd., and tripoli, item No. 01T41, $8.40 ppd., from Woodcraft, 41 Atlantic Ave., PO Box 4000, Woburn, MA 01888.

Illustrations: Jim Stevenson

Country Crafts Sampler



Here's a special section for those of you whose tastes run "a little-bit country." Don't miss the opportunity to craft a bench, construct a cabinet, toy with our country-cousin trucks, or cook up some gifts with our recipe box.

ENJOY THIS PROJECT
INDOORS OR OUT

A COMFY COUNTRY BENCH

An investment of less than $30 in materials and a couple of evenings in the workshop will yield a high return when building this simple, but pleasing bench. Use it indoors for informal seating or place it at garden side this summer for a comfortable seat to view the fruits of your labor.

Note: We hand-picked spruce 2×12s for the ends and 2×8s for the seat and back. Pine or fir will also work well. If you have trouble locating straight and uncupped stock, edge-join narrower pieces to width. Use epoxy or resorcinol for gluing outdoor projects.

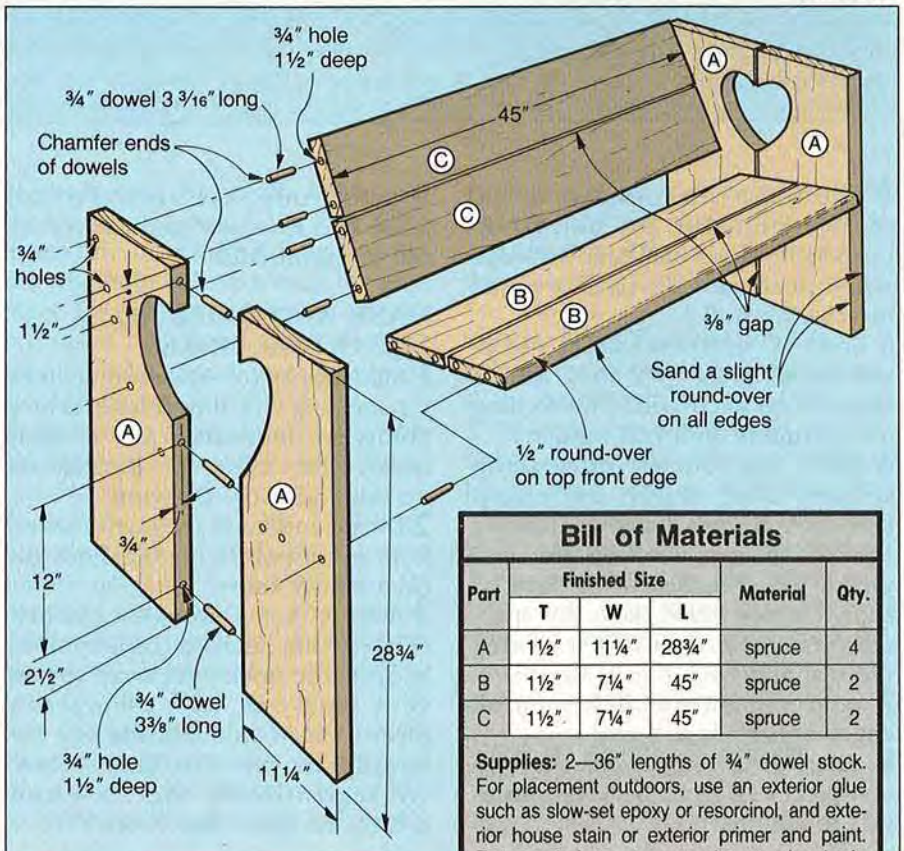
BUILD THE BENCH ENDS

1 Cut the end pieces (A) to 28¾" length from 2×12 stock. Draw a 1" grid measuring 5×10" on heavy paper or thin cardboard. Using the Heart Grid Half Pattern for reference, lay out the pattern for half a heart. Cut the template to shape.

2 Position the template, and trace the heart outline 3" from the top of each end piece where located on the End-View Drawing. Cut the outlines to shape on the bandsaw or with a jigsaw, and drum-sand to remove the saw marks.

3 To join the end pieces, start by clamping each pair of 2×12s (A) together edge to edge, with the top and bottom edges flush. Now, using the dimensions on the Exploded-View Drawing, mark the three dowel hole locations on one face. Remove the clamps. Using a square, transfer the lines to the inside edge of each end piece.

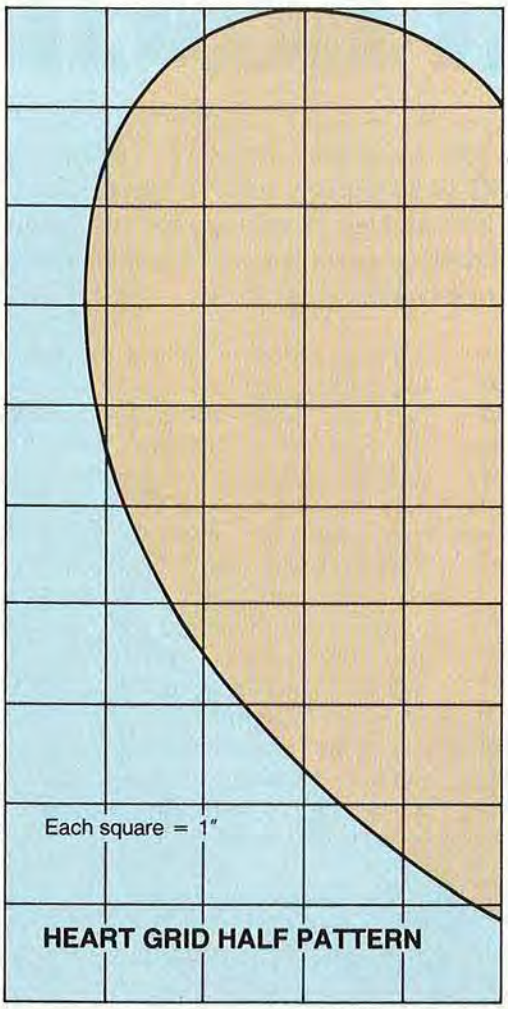
Continued



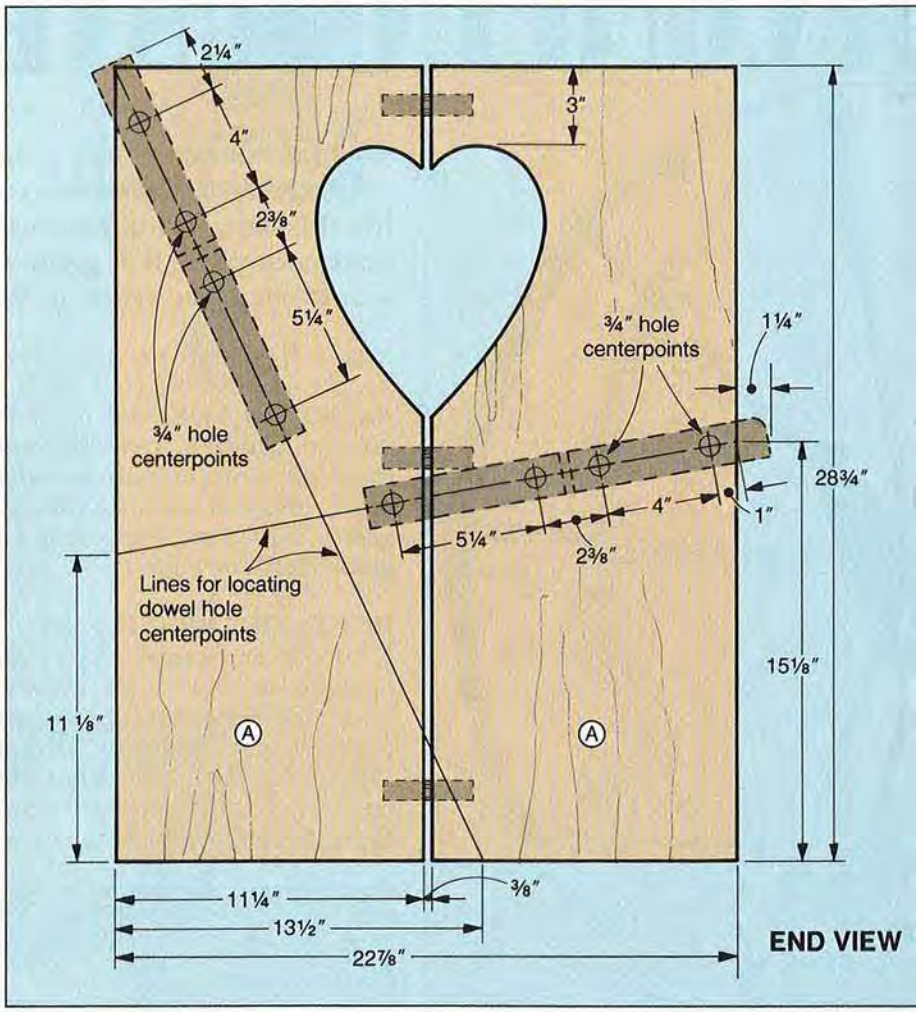
Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	1½"	11¼"	28¾"	spruce	4
B	1½"	7¼"	45"	spruce	2
C	1½"	7¼"	45"	spruce	2

Supplies: 2—36" lengths of ¾" dowel stock. For placement outdoors, use an exterior glue such as slow-set epoxy or resorcinol, and exterior house stain or exterior primer and paint. For use indoors, use regular woodworker's glue, stain, and polyurethane.



HEART GRID HALF PATTERN



END VIEW

4 Check that you're square to the surface, and drill ¾" holes 1½" deep centered from edge to edge where marked. (We used a portable electric drill.)

5 From ¾" dowel stock, set a stop, and cut six pieces 3⅜" long. Sand a chamfer on each end. (We formed our chamfers on a belt sander.)

6 Next, cut four ⅜"-thick scrap spacers. Glue, dowel, and clamp both bench ends together, placing the ⅜" spacers between the end pieces for a consistent ⅜" gap as shown *above right*. Save the spacers—you'll use them when joining the seat and back pieces later.

7 Sand a slight round-over on all edges of each bench end.

8 From 2×8" stock, cut the two seat pieces (B) and backrest pieces (C) to length.

9 Select one seat piece for the front, and rout a ½" round-over on the top front edge.

MARK AND DRILL ALL THE DOWEL HOLES

1 Mark a pair of intersecting lines for locating the dowel-hole center points on the *outside face* of each bench end, using the dimensions on the End View Drawing.

2 Locate and mark the eight dowel-hole centerpoints on the lines on each bench end.

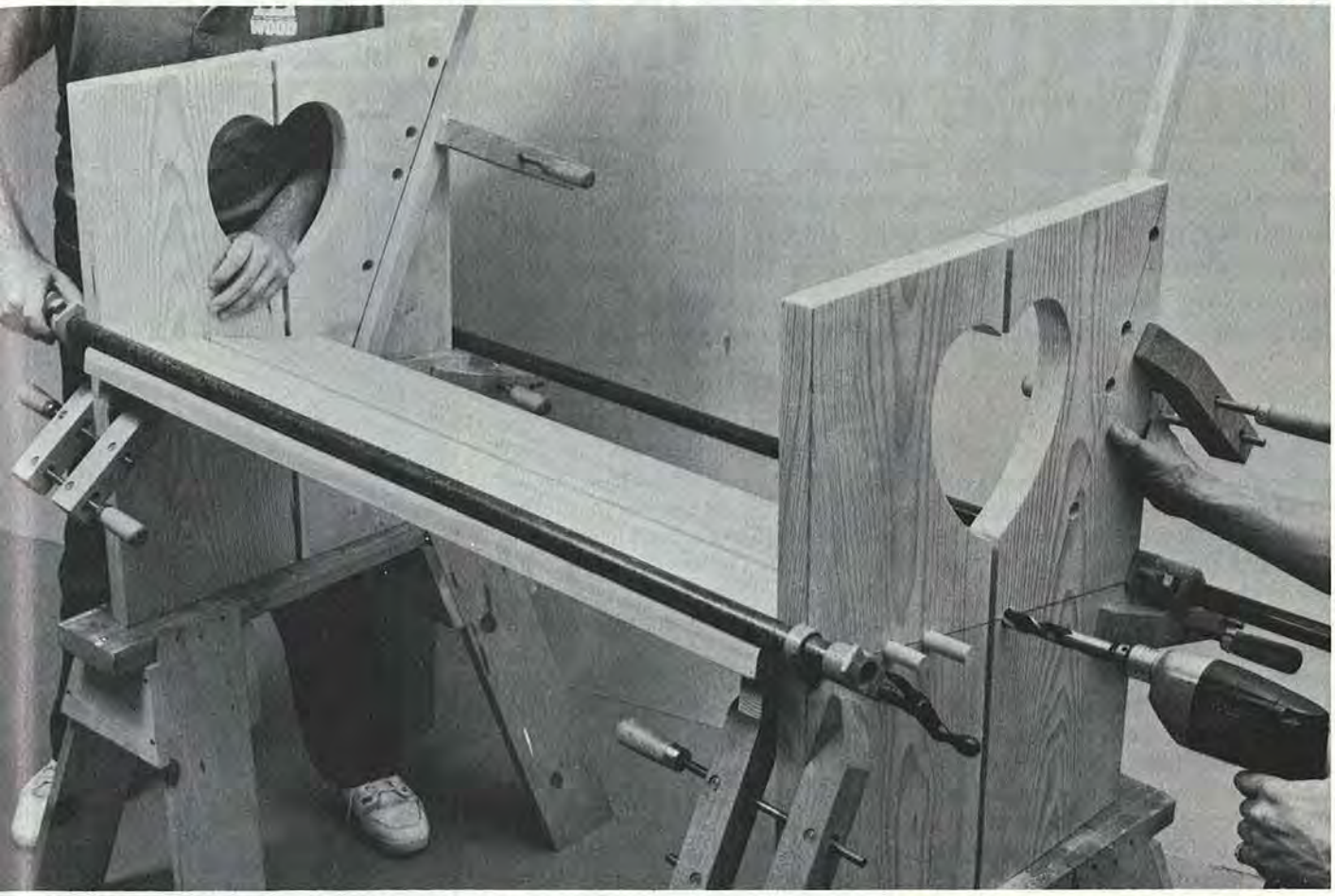
3 Bore ¾" holes through the bench ends at the marked centerpoints, backing the stock with scrap to prevent chip-out. (We clamped a piece of 2×4 on the inside face before drilling the first holes. Then, we repositioned the 2×4 and drilled the other four holes.)

ASSEMBLE THE PIECES

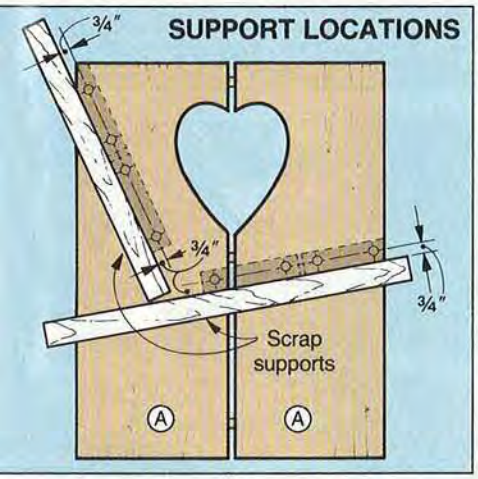
1 From ¾"-diameter dowel stock, set a stop, and cut 16 dowels 3⅜16" long. Sand a ⅜16" chamfer on both ends of each dowel.

2 Cut four 1×2 scraps to 26" long. Clamp two strips to the inside face of each bench end where shown on the drawing at *right*. The strips help center the seat and backrest pieces over the ¾" holes for drilling in the next step. (We positioned a piece of scrap 2×8 stock on each strip to check that the holes would center in the end of the stock.)

3 With a helper, position the seat pieces where located on the End View Drawing. Slip the ⅜" spacers between the pieces for a consistent gap. Then, clamp the seat pieces firmly between the bench ends, as shown in the photo *above right*.



Position the two seat and two back pieces on the support strips, and clamp them in place between the end pieces. Then, use the previously drilled ¾" holes in the bench ends as guides, and drill dowel holes 1½" deep into the seat pieces.



4 Chuck a ¾" bit into a portable electric drill. Using the previously drilled holes in the end sections as guides, drill a pair of 1½"-deep holes squarely into each seat piece as shown in the photo *above.* As soon as you've drilled the first hole, insert one of the 3⅜16"-long dowels into the hole to help steady the seat piece for drilling the next hole. Do not insert the dowel more than ½" into the seat piece; you may have trouble removing it if you do.

5 Repeat the procedure to drill the ¾" holes in both ends of the backrest pieces.

6 Remove one of the 3⅜16"-long dowels. With a small brush, coat the inside of the hole with glue. To prevent marring the chamfered dowel end, use a rubber-tipped mallet to slowly drive the dowel into the hole. Drive the dowel until just the chamfered end protrudes. Be careful not to drive the dowels too far—they're almost impossible to back out. Immediately wipe off any excess glue with a damp cloth. Repeat for each remaining dowel. Let the glue dry and then remove the clamps.

SAND, PAINT, AND ENJOY

1 Sand the entire bench, sanding a slight round-over on all edges.

2 To keep the wood grain visible, finish the bench with an exterior house stain for use outdoors. For use indoors, apply regular stain and a clear finish such as polyurethane. If you wish to paint the bench and set it outside, apply an exterior primer followed by two coats of exterior paint. Use an interior primer and paint for use indoors.

Project Design: James R. Downing
Photographs: Bob Calmer; Hopkins Associates
Illustrations: Kim Downing; Mike Henry

CHARMING COUNTRY CABINET

BUILD THIS PROJECT FOR UNDER $20

Country cabinets once held everything from medicinals to canned goods. Like our cabinet, they were sturdy and useful. Enhancing the country image, we've decorated the door panel with a pattern of a wheat shock—ever-so present at threshing time—using our stain-resist technique on page 46. We hope you'll agree our cabinet's a winner by a country mile.

LET'S START WITH THE CARCASS

1 Cut the two sides (A), shelf (B), lower shelf and cleat (C), top (D), towel bar (E), and two adjustable shelves (F) to the sizes listed in the Bill of Materials.

2 Cut or rout a ⅜" rabbet ¼" deep along the back inside edge of each side piece (A).

3 Using the dimensions on the Exploded-View Drawing, mark the shelf-support hole centerpoints on the inside face of the side pieces. Clamp a fence to your drill press table, and drill ¼" holes ⅜" deep in the side pieces. (We set the fence 1" from the drill-bit center for drilling the back rows in both pieces, and 1¾" from the drill-bit center when drilling the front rows.)

4 Mark a curved notch on the front bottom corner of each side piece. Cut the curved notches to shape.

5 Glue and clamp the shelf (B) and the lower shelf and cleat (C) between the sides where shown on the drawing; check for square.

6 With the assembly still clamped together, mark screw-hole centerpoints on each side piece where shown on the Exploded-View Drawing. Drill and counterbore the holes (see the Screw-Hole Detail for hole sizes). Drive the screws, plug the counterbores, and sand the plugs flush. (We cut our plugs from scrap pine stock with a ⅜" plug cutter.) Remove the clamps.

7 Cut the plywood back (G) to size. Glue and nail it into the rabbet. (Use the back to pull the carcass into square if necessary.)

8 Rout ¼" round-overs along the front edges of the towel bar (E). Referring to the Screw-Hole Detail for hole sizes, drill holes in the bar and the top (D). Then, fasten both to the cabinet. Plug the holes.

9 Drill the mounting holes through the cleat (C) for hanging the cabinet to the wall.

NOW, CONSTRUCT THE RAISED-PANEL DOOR

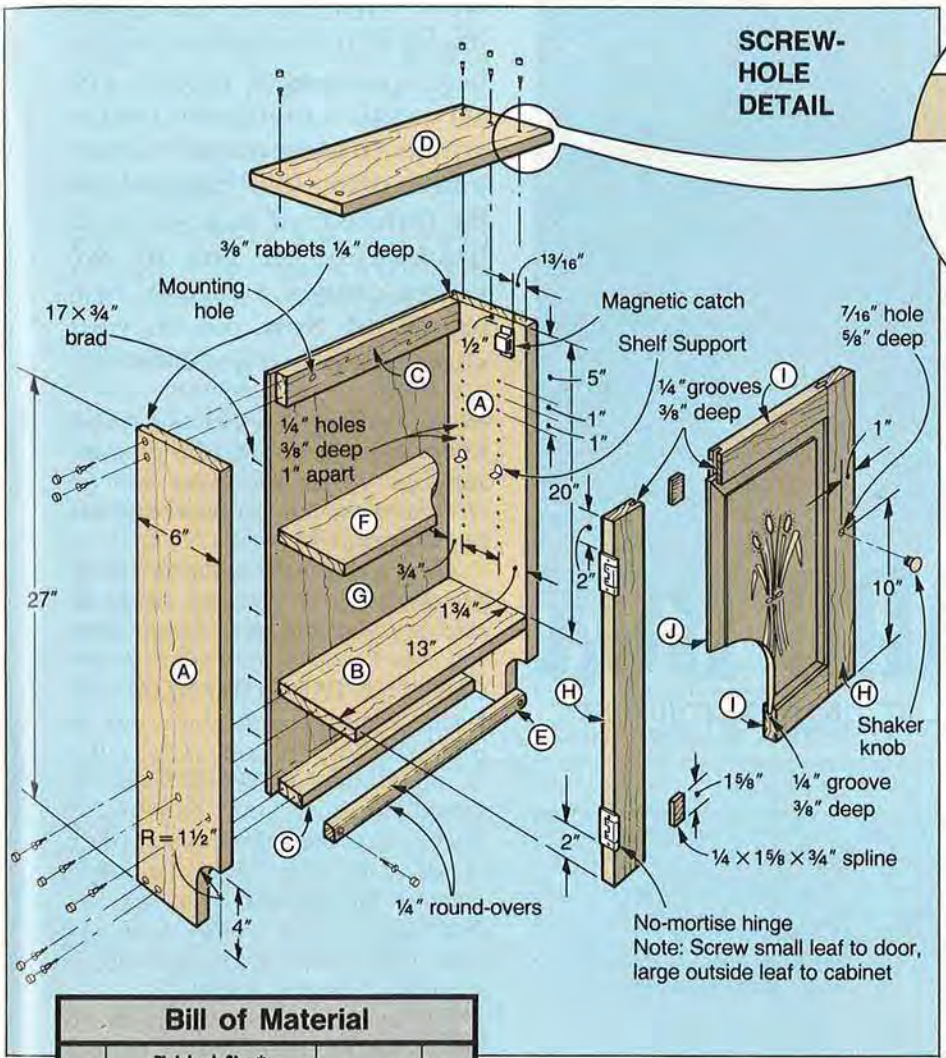
1 Cut the door stiles (H) and rails (I) to size. Cut a ¼" groove ⅜" deep centered along the inside edge of both stiles and rails. Using a push block for support as shown in the photo at *right*, cut the same-sized groove in the end of each rail.

2 Edge-join two or three pieces of ½" stock to form the door panel (J). (We used drawer-side material; it measures ½" thick.) Later, sand smooth, and cut the door panel to size. (We cut ours 1/16" undersize to allow for wood movement of the assembled door later.)

3 As shown on the drawing *far right*, tilt the blade 10° from center, position the fence, and cut all four edges of the panel. Sand the shoulders square, and then sand the beveled areas smooth to remove the saw marks (we used a block sander). Finish-sand the panel.

4 Using our stain-resist technique starting on page 46 and our wheat-shock pattern on page 84, form the pattern on the panel front. Stain the panel. Staining the panel after assembling the door may cause unsightly white lines should the panel shrink inside the door frame later.

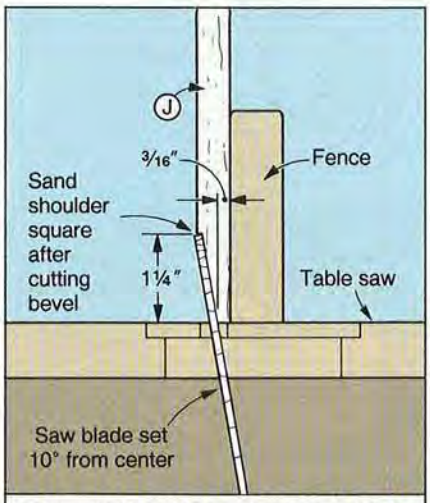
Using a push block for support, cut the grooves in both ends of each rail.



Bill of Material

Part	Finished Size* T	W	L	Material	Qty.
CABINET					
A	3/4"	6"	27"	pine	2
B	3/4"	5 3/4"	13"	pine	1
C	3/4"	2"	13"	pine	2
D	3/4"	6 1/2"	15 1/2"	pine	1
E	3/4"	3/4"	14 1/2"	pine	1
F	3/4"	4 3/4"	12 7/8"	pine	2
G	1/4"	13 3/4"	27"	birch plywood	1
DOOR					
H	3/4"	2"	19 7/8"	pine	2
I	3/4"	2"	8 7/8"	pine	2
J	1/2"	9 9/16"	16 9/16"	pine	1

Supplies: #8 × 1 1/4" flathead wood screws, 17 × 3/4" brads, stain.



CUTTING THE RAISED PANEL

5 Cut four pine splines. Dry-clamp the door parts together, checking for tight-fitting joints and a square assembly. Trim the splines if necessary; then glue and clamp the door together. Let the panel float in the stile and rail grooves.

6 The door should be 1/8" shorter in length and width than the opening; trim if necessary. Drill the hole for the door knob where shown on the Exploded-View Drawing, and glue the knob in place.

YOU'VE JUST ABOUT GOT IT MADE

1 Finish-sand the cabinet carcass, cabinet back, door frame, and adjustable shelves. Stain and finish.

2 Mount the hinges to the door (see the Exploded-View Drawing), and then mount the door to the cabinet. Attach the magnetic catch to the carcass and the strike plate to the door. Hang the cabinet on the wall and check for level. Install the shelf supports and shelves.

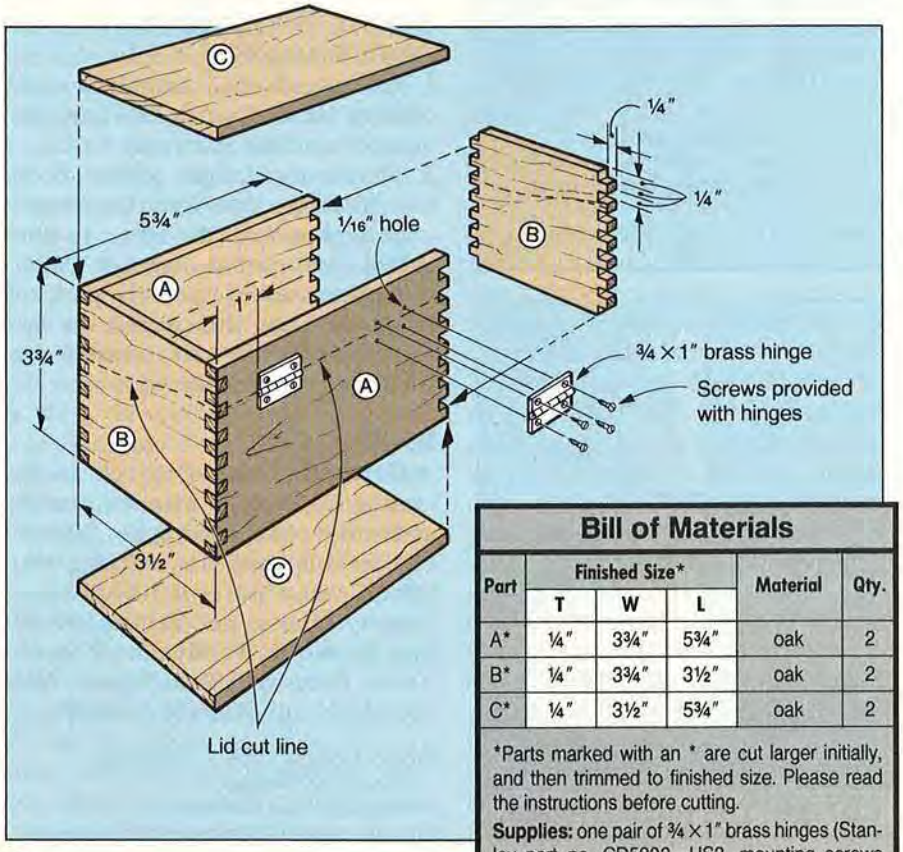
BUYING GUIDE

• ***Hardware kit.*** 7/8" beech knob, catalog no. B1674; magnetic catch and strike plate, catalog no. D2107; eight shelf supports, catalog no. D9157; one pair of no-mortise hinges, catalog no. D3932. $8.80 ppd. from The Woodworkers' Store, 21801 Industrial Blvd, Rogers, MN 55374, or call 612/428-2199.

Project Design: James R. Downing; Mary Morel Briggs
Photographs: Jim Kascoutas
Illustrations: Kim Downing; Bill Zaun

RECIPE CARD BOX

WITH ALL THE RIGHT INGREDIENTS



Bill of Materials

Part	Finished Size*			Material	Qty.
	T	W	L		
A*	¼"	3¾"	5¾"	oak	2
B*	¼"	3¾"	3½"	oak	2
C*	¼"	3½"	5¾"	oak	2

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: one pair of ¾ × 1" brass hinges (Stanley part no. CD5302—US3, mounting screws supplied with hinges), double-faced tape, spray-on adhesive, carbon paper, stain, finish.

Print this article

We hope you'll agree that we've mixed in all the ingredients to make our oak recipe box a successful project. For strength and good looks, we've incorporated finger joints using our finger-joint jig featured on page 48 And, bandsawing the box in two pieces creates a stylish contoured lid. Now, put on your shop apron and get cookin'!

Note: *For ease in cutting finger joints for this and future projects, see page 48 for the plans and instructions on how to build and use our box-joint jig.*

Also, you'll need some ¼" stock for this project. You can either resaw or plane thicker stock to size.

CUT THE PARTS TO SIZE

1 Cut a piece of ¼"-thick oak to 3¾" wide by 35" long. (We cut a ¾"-thick board to 3¾ × 20" and resawed the board into two pieces. Then, we planed down each piece to ¼" thick. This yielded enough material for one box.) Cut the box front and back (A) to 5¾" long and sides (B) to 3½" long (we used a stop for consistent lengths).

2 Rip the remaining oak piece to 3½" wide for the top and bottom (C). Next, cut the top and bottom to 5¾" in length.

FINGER-JOINT THE PIECES

1 To finger-joint both front and back pieces simultaneously, tape the pieces together face to face with double-faced tape. Check that the edges and ends are flush. Repeat the taping procedure with the side pieces.

2 Mount a ¼" dado blade to your tablesaw (we used a stackable blade). Raise the dado blade ¼" above the surface of your saw table. Now, elevate the blade about 1/32" more. (We found it is best to have the fingers a bit long, and sand them flush with the box sides after final assembly.)

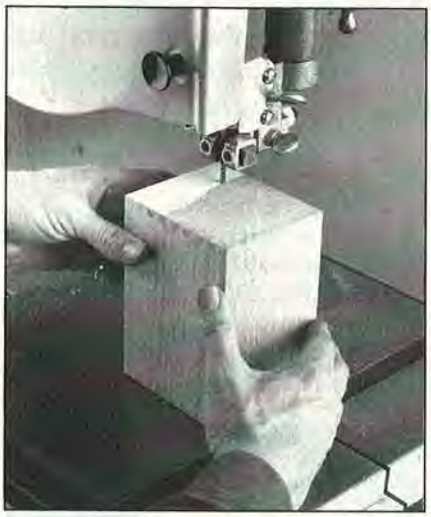
3 Fasten the box-joint jig to your miter gauge. Follow the drawings *below* to cut the notches in the front, back, and side pieces. After notching the ends of each piece, separate the pieces, remove the tape, and sand smooth. (We used a thin, wedge-shaped piece of wood to pry apart the taped-together pieces. We tried prying the first two pieces apart with a screwdriver and dented the wood slightly.)

ASSEMBLE THE BOX

1 Glue and clamp the notched box pieces (A, B) together, checking for square. (We placed masking tape on the inside next to the finger joints to catch the excess glue. We applied the glue to the finger joints with a small brush.)

2 Later, remove the clamps and sand the oak box smooth. Sand the top and bottom edges of the box flat if necessary.

3 Glue and clamp the top and bottom pieces (C) to the box assembly. Later, remove the clamps and sand the box smooth.



Adhere the lid pattern to one end of the box with spray-on adhesive. Cut the box in two on the bandsaw.

CUT THE BOX IN TWO, AND YOU'RE ALMOST THROUGH

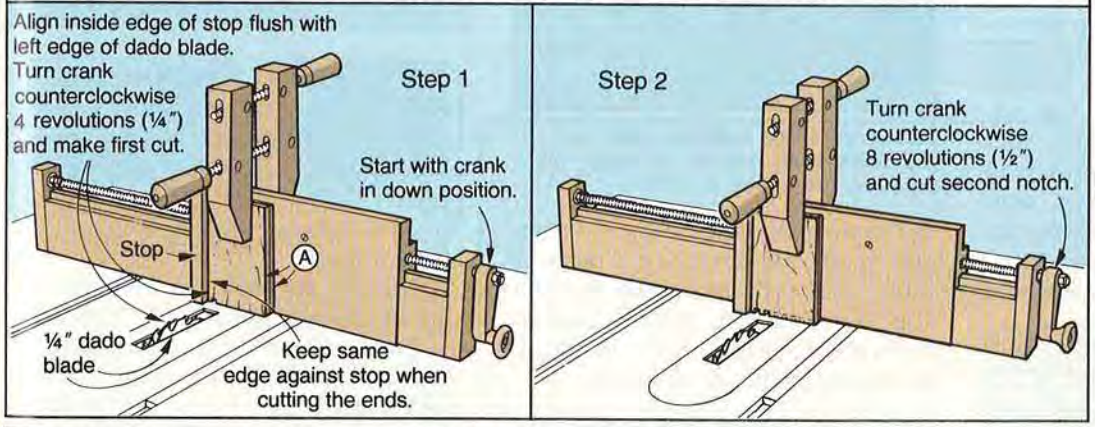
1 Using carbon paper, transfer the pattern *below* to a piece of paper. Cut the pattern to shape. Apply spray-on adhesive to the back of the pattern, and stick the pattern to the box where shown at *left*.

2 Mount a ¼" blade to your bandsaw; check the blade against the table for square. Saw along the marked cutline to cut the box in two as shown in the photo at *left*. Remove the paper pattern.

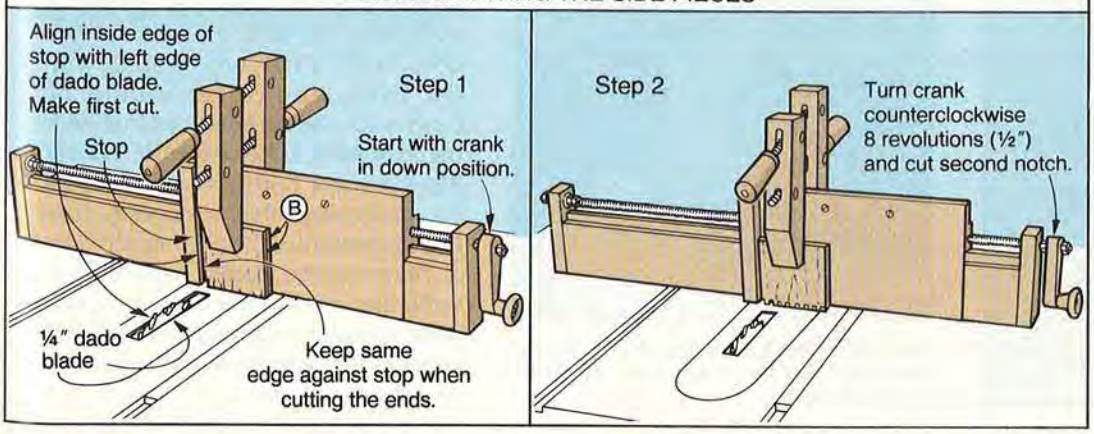
3 Clamp the lid to the box body with all the surfaces flush. Drill the pilot holes and attach a pair of hinges to the back of the box where shown on the Exploded-View Drawing. The screws will pass through to the inside of the box. Snip or file off the screw points, and then sand them flush.

4 Sand the box. Mask the hinges, and apply stain and finish.

FINGER-JOINTING THE FRONT AND BACK PIECES

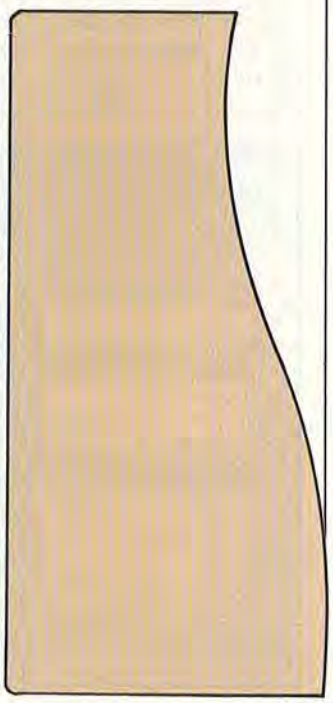

Align inside edge of stop flush with left edge of dado blade.
Turn crank counterclockwise 4 revolutions (¼") and make first cut.
Step 1
Start with crank in down position.
Stop
A
¼" dado blade
Keep same edge against stop when cutting the ends.
Step 2
Turn crank counterclockwise 8 revolutions (½") and cut second notch.

FINGER-JOINTING THE SIDE PIECES


Align inside edge of stop with left edge of dado blade.
Make first cut.
Step 1
Stop
Start with crank in down position.
B
¼" dado blade
Keep same edge against stop when cutting the ends.
Step 2
Turn crank counterclockwise 8 revolutions (½") and cut second notch.

Project Design: James R. Downing. Photographs: Hopkins Associates; Bob Calmer. Illustrations: Kim Downing; Bill Zaun

FULL-SIZED LID PATTERN



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COUNTRY COUSINS

MILK TRUCK & PICKUP

Start to finish, it won't take you more than an evening or two to build these delightful pint-sized vehicles. Whether you use them as country decorations or present them to a lucky child as a gift, you can count on these trucks being a big hit.

Note: *The following directions are for the milk truck. We built the pickup nearly identically except for the pickup box and rear-wheel spacers. See the box on page 82 for alterations when building the pickup.*

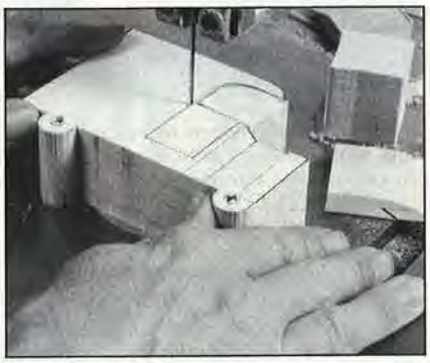
CUT THE CHASSIS TO SHAPE

1 Cut a knot-free 12" length from a pine, fir, or spruce 2×6. Plane or joint one edge (not a face) to remove the rounded corners. Crosscut the 12" length in half. You'll need one 6" length now for the milk truck body (A) and the other one later if you decide to build the pickup body (B).

2 Using carbon paper or a photocopy machine, transfer the full-sized side-view milk-truck pattern to white paper. Apply spray-on adhesive to the back of the paper pattern. Apply the side-view pattern to one of your 6"-long blocks, with the *top* of the pattern flush with the *planed* edge of the block. Now, crosscut the front and back of the milk-truck body flush with the marked pattern lines.

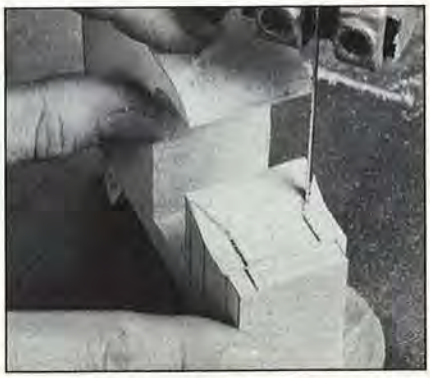
3 Drill a pair of 9/32" axle holes where located on the pattern.

4 Using a bandsaw fitted with a 1/8" blade, follow the pattern lines to cut the truck side profile to shape as shown in the photo *below*.



Square the blade with the table, and cut the truck body profile to shape on a bandsaw fitted with a 1/8" blade.

5 Position the truck right side up, and mark the hood and radiator lines where dimensioned on the Top View Drawing. Cut the front of the truck to shape on the bandsaw as shown in the photo *below*.



Carefully mark the two hood layout lines, and cut the truck front to shape on the bandsaw.

Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
MILK TRUCK BODY					
A	1½"	3½"	4⅝"	pine	1
PICKUP BODY					
B	1½"	3½"	4"	pine	1
C	1⅜"	1¼"	2"	pine	1
PARTS FOR BOTH TRUCK BODIES					
D	¼"	1"	4⅝"	pine	4
E	⅝"	1¼"	1¼"	pine	2
F	¼"	1½" diameter		pine	8

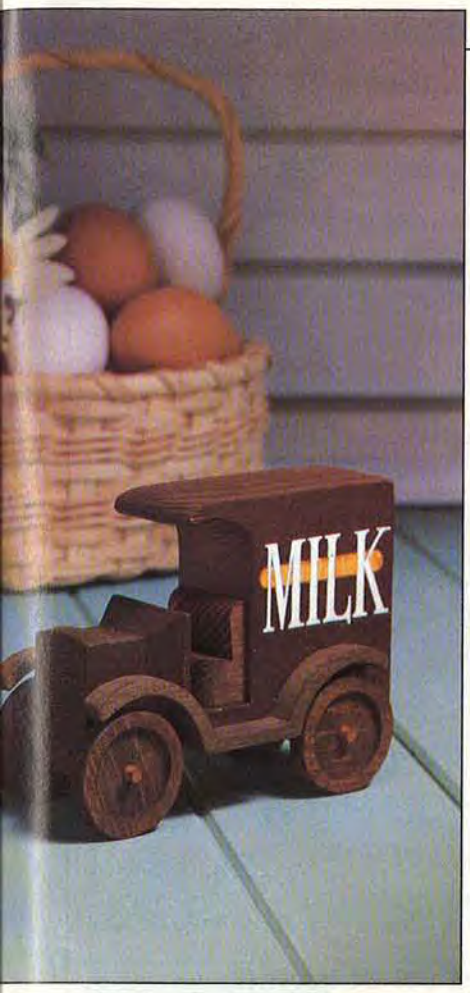
Supplies: ¼" dowel, ½" dowel, spray-on adhesive, stain, finish.

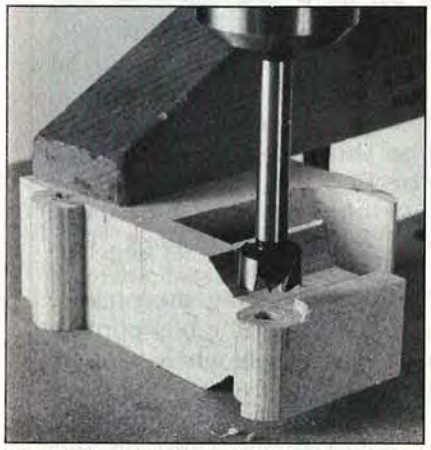
FORM THE RECESS FOR THE FRONT-WHEEL SPACERS

1 Chuck a ⅝" flat-bottomed bit (we used a Forstner bit) into your drill press. (The recommended speed for a ⅝" Forstner bit in softwood is 2,400 rpm.)

2 Position the truck body on its side on the drill-press table. Center the bit over the previously drilled front-axle hole, and clamp the truck body firmly to the drill-press table with a handscrew clamp. Now, as shown in the photo at *right*, start the drill, and bore a 1/16"-deep hole. (The area bored with the flat-bottomed bit should be flush with the motor sides cut with the bandsaw.) Remove the clamp, flip the truck body over, and repeat the centering, clamping, and drilling operation on the other side.

3 Remove the paper pattern, and sand the truck body smooth. (Lacquer thinner works great for dissolving the adhesive and releasing the paper pattern.)



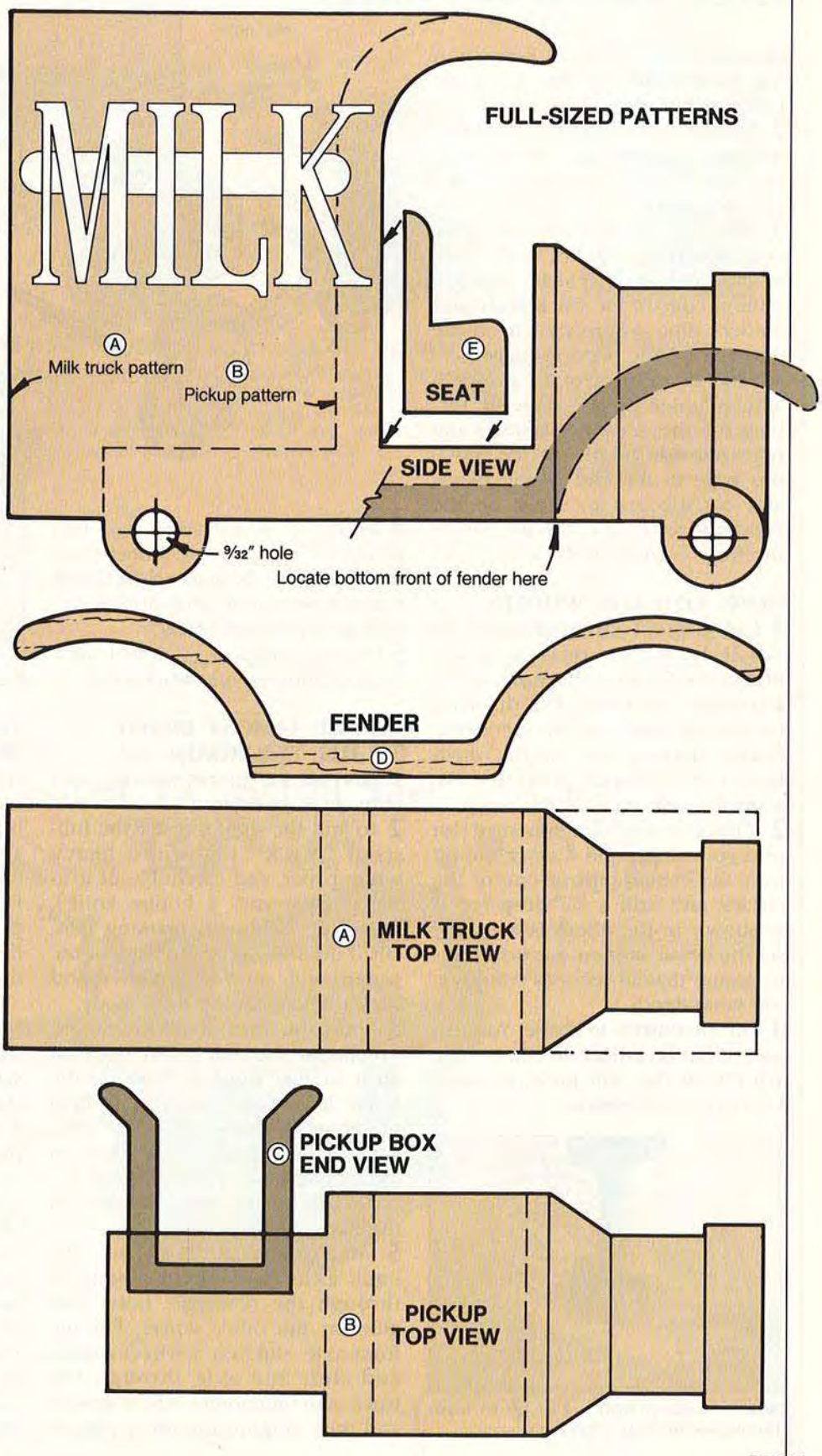


Finish forming the wheel-spacer recess with a flat-bottomed bit.

SHAPE AND ATTACH THE FENDERS AND SEAT

To form the fenders (D), start by crosscutting a 12" length from a 2×4. Plane one edge (not a face) to remove the rounded corners. Position the rip fence on your tablesaw ¼" from the inside edge of the saw blade. Now, rip the planed edge from the 2×4 for a piece

Continued



MILK TRUCK & PICKUP

measuring ¼ × 1½ × 12". Reposition the fence, and rip the 1½"-wide piece to a 1" width.

2 Transfer the full-sized fender pattern twice to the face of the stock, and band-saw two fenders from the 12"-long piece.

3 Sand the fenders smooth. Glue and clamp the fenders to the side of the truck body. (Make sure the bottom edge of the truck body and fenders align where shown on the drawing on the previous page.)

4 Band-saw a piece of 2 × 4 material to ⅝" thick by 1½" wide by 1¼" long for the seat (E). Transfer the full-sized side profile on the previous page to the end of the block, and cut the seat to shape on the bandsaw. Sand a ¼" round-over on the front corners of the seat.

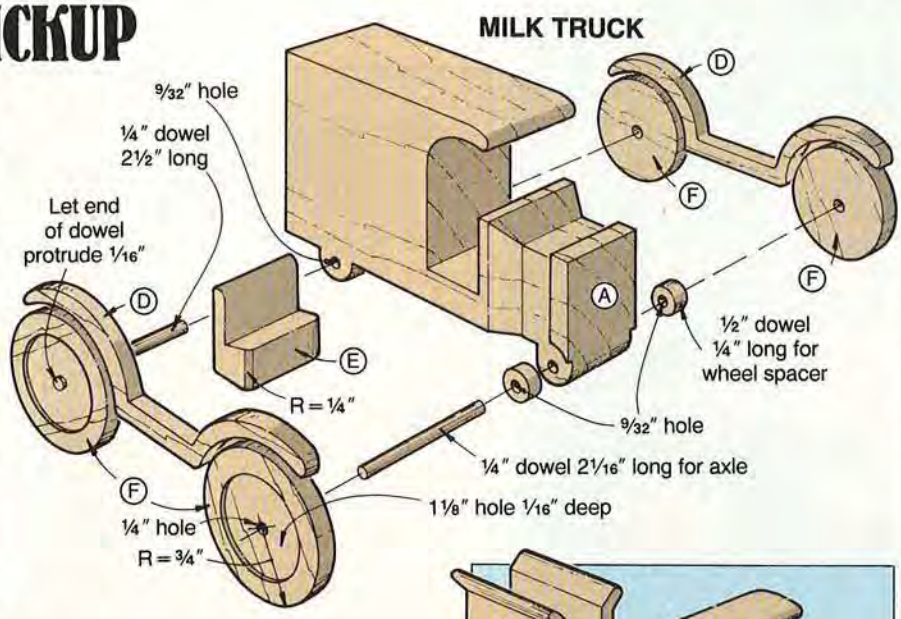
NOW, ADD THE WHEELS

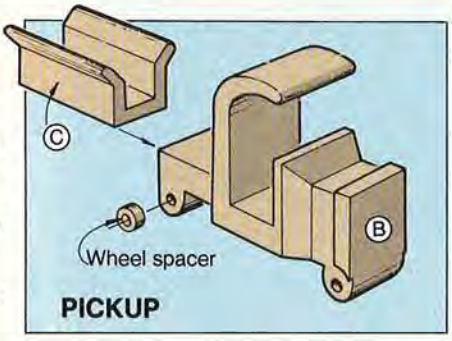
1 Cut a piece of pine stock to ¼ × 2½ × 12" (we resawed a section of 2 × 4 material to size). Using a compass, mark four 1½"-diameter circles on one face of the stock. When marking the circles, push hard on the compass point to make a small indentation in the wood.

2 Chuck a 1⅛" flat-bottomed bit into your drill press. Center the bit over the centerpoint of one of the circles, and drill a 1/16"-deep recess as shown in the photo *below*. (We set the depth stop on our drill press to ensure that all recesses would be the same depth.)

3 Cut the wheels to shape. You can use a circle cutter to shape the wheels on the drill press, or use a bandsaw or scrollsaw.

Bore 1/16" deep with a 1⅛" bit to form the recess in each wheel.





4 From ½" dowel stock, cut two pieces ¼" long for the wheel spacers. Clamp each spacer in a small handscrew clamp, and drill a 9/32" hole in the center of each.

5 Cut two pieces of ¼" dowel stock to 2 1/16" long for the truck axles.

YOU'RE ALMOST READY TO HIT THE ROAD

1 Sand all the pieces smooth, and stain them as desired.

2 To add the sign, transfer the full-sized "MILK" logo onto heavy white paper, and carefully cut it to shape (we used a hobby knife). Color the sign with marking pencils if desired. Spray the back of the pattern with spray-on adhesive, and stick the logo to the truck body.

3 Apply the finish to all the pieces, except for the axles. (We sprayed on a lacquer finish.) Covering the MILK logo with finish will help protect it over time.

4 Glue one wheel to each axle so the wooden axle protrudes 1/16" beyond the wheel where shown on the Exploded-View Drawing.

5 After the glue dries, slide the back axle and wheel assembly through the rear axle hole, and glue on the other wheel. For the front axle, slide on a wheel spacer, and slide the axle through the truck, slip on another wheel spacer, and then glue on the other wheel.

TIPS ON BUILDING THE PICKUP

Now that you've mastered the milk truck construction, try your hand at building our closely related pickup. To do this, transfer the pickup-body outline shown on the Full-Sized Pattern Drawing on the previous page to the piece of 2 × 6 stock cut in Step 1 under the heading "Cut the Chassis to Shape."

When band-sawing the pickup body to shape, cut the box portion from the truck body where marked with dashed lines on the full-sized side-view pattern. Using the full-sized Box Drawing (also on the previous page), band-saw the box to shape, hand-sand smooth, and glue it onto the pickup chassis. As shown on the Exploded-View Drawing of the pickup *above*, you'll need to form two rear-wheel spacers to prevent the back wheels from rubbing against the sides of the pickup box.

Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun

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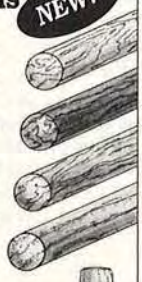

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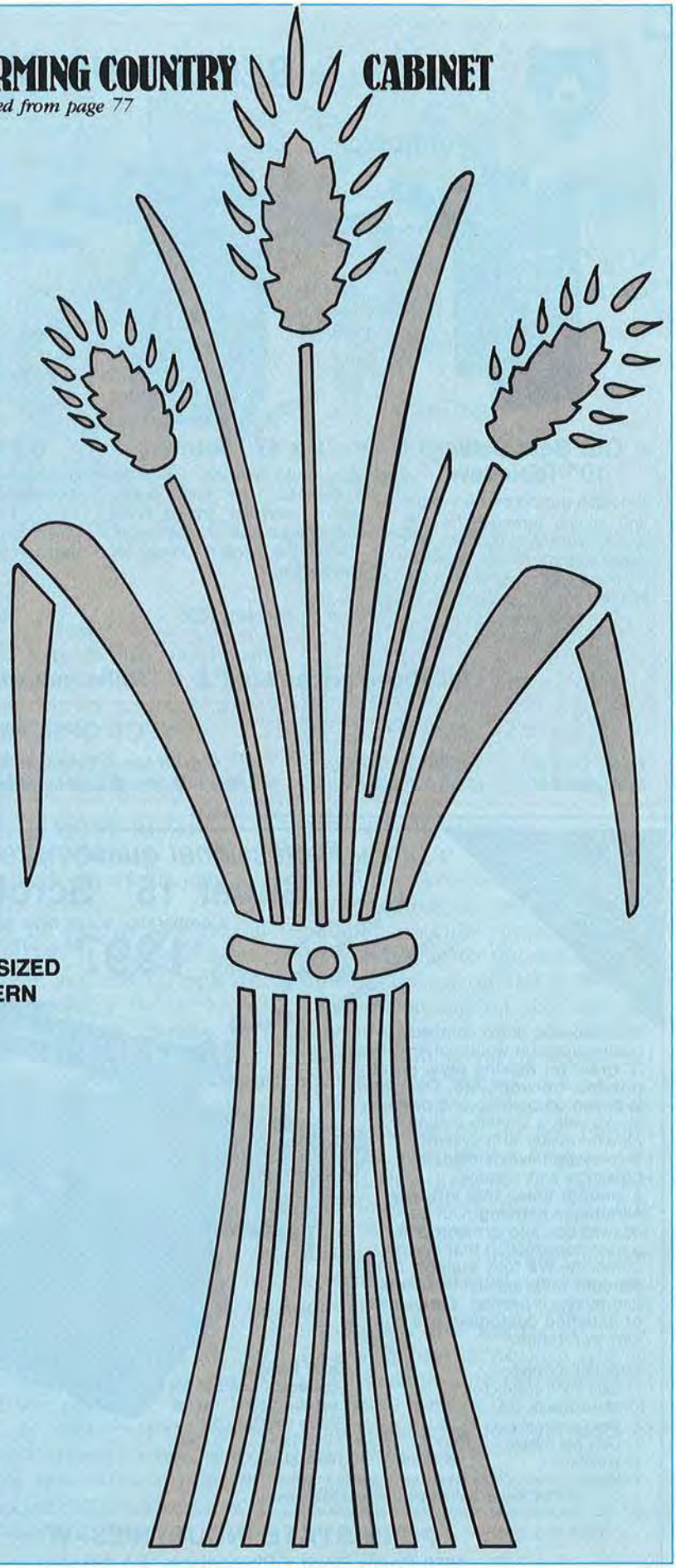

FULL-SIZED PATTERN

PALDAO
A TRUNKFUL OF HORRORS

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Prospectors seeking their fortunes in New Guinea during the gold rush of the late 1800s came across huge trees whose wood reminded them of walnut. They called this newfound stock "Guinea wood" and used it for mining construction.

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To the hill tribes in remote parts of the Philippines, the buttressed paldao trees once represented a trunkful of horrors. They viewed the trees in fear and awe because they imagined that frightful things, such as armies of evil spirits, hid in the nooks and crannies. In truth, boa constrictors lived there. And in the recesses, head hunters hid.

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Photograph: Bob Calmer
Illustration: Jim Stevenson

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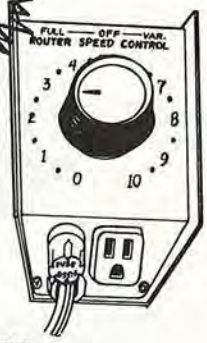

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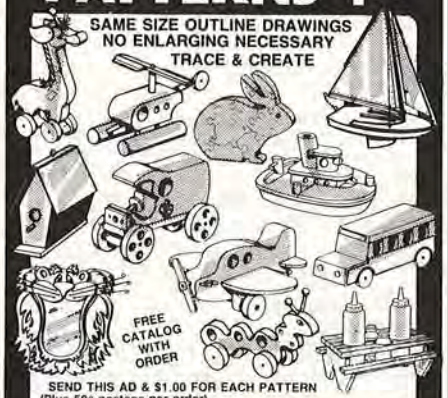

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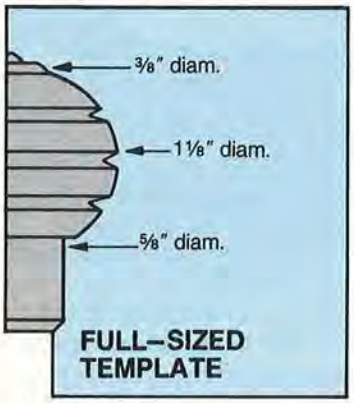
PERFUME DECANTER

Continued from page 63

"I take pride in making every stopper a bit different," Myles says. (See the Full-Sized Template *below* to shape the stopper shown in the photograph on page *63*.) "When making the fine V-cuts in a stopper, I use a ¼" parting tool. I lay the tool on its side on the tool rest, and scrape with the side of the tool rather than the flat face," he explains. Use the full-sized template drawing for reference if you decide to make this particular stopper. (In making a few of our own decorative stoppers in the *WOOD*® magazine shop, we found that a skew also works well for forming the stopper and making the V-cuts.)

Next, Myles turns the bottom portion of the stopper at a very slight taper for a snug fit into the ⅝" hole in the cylinder. Finally, he sands the stopper smooth, makes the parting cuts (see the stopper drawing on page *63* for reference), and seals the stopper and body with a clear finish.



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Photographs: Jim Kascoutas; Pam Gilmer
Illustrations: Kim Downing; Bill Zaun

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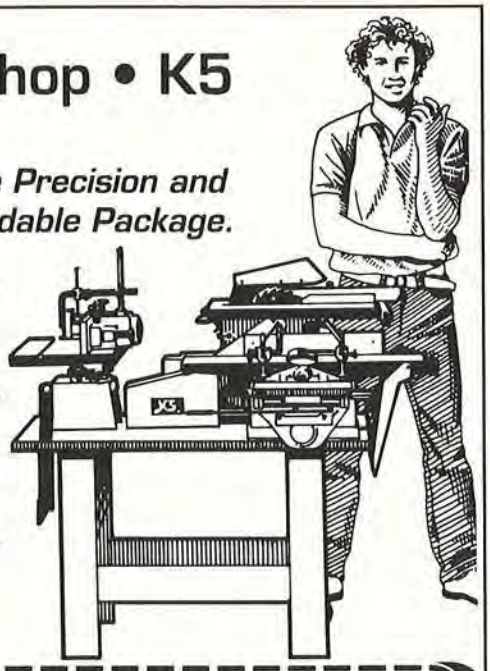

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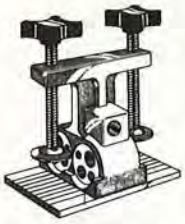

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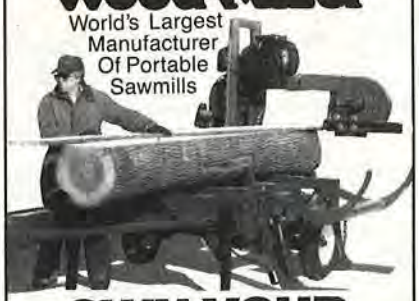

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ASK WOOD

Print this article

Whether your woodworker's license reads "Beginner," "Intermediate," or "Advanced," you're bound to have a few questions about your favorite hobby. We can help. We'll consult our experts for answers. Send your questions to:

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Due to the volume of mail, we can't promise to answer all questions, but we'll try. We may edit letters selected for publication.

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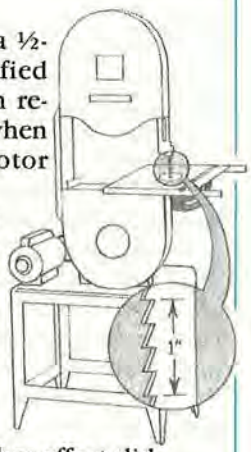

I have a 14" Delta bandsaw with a ½-hp., 110-volt motor. I was satisfied with its performance except when resawing stock 3" or greater. Even when using a slow feed rate, the motor bogged down.

I purchased a 1-hp., 220-volt motor that turns at 3,450 rpm (twice the rpm of the ½-hp. motor) and a 12" drive pulley. The saw has the same blade speed as before, but now resaws thick stock without bogging down.

My question is, other than doubling the horsepower, what other effect did doubling the drive-pulley size and changing to 220 volts have on the saw's performance?

—Marc D. Phillips, Lakewood, Calif.

Lou Brickner, vice president of engineering and product development for Delta International Machinery Corp., agrees that you have found one solution to resaw 3" or larger material. However, he suggests that readers may want to consider one of two other less-expensive alternatives. Lou recommends a ¾" skip-tooth blade (4 teeth per inch) when resawing most material with a ½-hp. motor. In Delta's shop, they resaw 6"-thick stock with this blade and a ½-hp. motor. You also could step up to a ¾-hp. motor that Delta offers as standard equipment on all enclosed-stand models and one open-stand machine.

IN SEARCH OF THE PERFECT SANDING DISC

I have a 6" disc sander that uses pressure-sensitive adhesive discs. Is there a sanding wheel—perhaps diamond embedded—that lasts forever? I am tired of the time it takes to change the discs.

—Lisa Keena, Glendora, Calif.

We know of no permanent sanding discs on the market. However, quality does vary. Auto paint/finish stores sell some of the toughest abrasives we've seen.

Continued on page 90

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	#04	1/4" R	1/4"	1"	1/2"	$15.00
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	#06	1/2" R	1/2"	1-1/2"	3/4"	19.00
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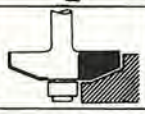	#15	Raised Panel	20° Angle	1-5/8"	1/2"	$25.00
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ASK WOOD

Continued from page 89

HUMIDITY CRISIS

I have become a victim of the "humidity crisis." Recently, I moved from dry Phoenix, Arizona, to the opposite end of the moisture scale, the New Jersey shore.

My main concern is a contemporary-style entertainment center. I used mostly solid oak with oak veneer plywood for the side panels. After living in Jersey for only a couple of months, the drawers and doors began to stick. All the doors and drawers have swollen—some as much as 5/32". I had no idea finished wood could change so much.

I finished my project with one coat of Watco Danish oil and three coats of Deft wood finish. Each coat dried completely before rubbing and recoating.

What did I do wrong? If I plane down the doors and drawers, would I have the reverse problem if I moved back to Arizona?

—John Comer, Toms River, N.J.

Moves from one climate to another can play havoc on furniture. The bottom line, John, is that wood breathes and moves. Here in the Midwest, furniture suffers through humid summers and moisture-deprived winters due to forced-air heating.

For future projects, metal slides will diminish the problem of shrinking and expanding drawers. If there's a chance you'll move again to the Southwest, we don't suggest planing the doors and drawers—you could experience too large of gaps.

Continued from page 33

WOOD Magazine, 17th at Locust, Des Moines, IA 50336. Do not send this request with your entry. Winners will receive a manufacturer's certificate for the amount of the prize won, to be redeemed for merchandise through the manufacturer or a dealer.

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3M's STRIPPER: DRAMATICALLY DIFFERENT

CAN SOMETHING
THAT SOUNDS
THIS GOOD WORK?

Few woodworking chores match the unpleasantness of stripping paint, varnishes, and other finishes from old furniture. Nevertheless, 3M says that one-third of the U.S. population has been involved in at least two refinishing projects during the past five years. So when the people at 3M told us they had developed a nonflammable stripper that doesn't emit harmful fumes or unpleasant odors *and* won't burn your skin, we couldn't wait to get our hands on the stuff.

Called Safest Stripper, the product lived up to its name. Unlike other strippers containing methylene chloride that have container labels plastered with warnings, the 3M label only warns that Safest Stripper can cause irritation of eyes on contact. After watching a 3M employee hold his hand in the product for about 15 minutes at a National Hardware Show demonstration in Chicago, we felt confident enough to tackle a refinishing project without using rubber gloves. Our subject: a 50-year-old oak chair with one coat of varnish. Although we exposed our hands to the product for more than 30 minutes, they showed only slight dryness after wash-up. The substance released a slight odor, but nothing objectionable.

SO IT'S SAFE, BUT DOES IT GET THE JOB DONE?

Safest Stripper works slower than strippers containing methylene chloride, but we found that with liberal applications, patience, and a little extra elbow grease, it removes varnishes and paints as well as any other stripper we've tried. On the oak chair, we followed the directions and applied a ⅛" coat to all surfaces and waited 20 minutes for the stripper to work.

We had similar results on a walnut dresser with two coats of paint over a coat of varnish. A single application of Safest Stripper dissolved both coats of paint in 2 hours as claimed, but didn't remove as much of the original varnish as a methylene chloride stripper. Scrubbing a second application into the surface revealed bare wood.

Unlike other paint and varnish removers, Safest Stripper doesn't dry out quickly. In fact, we found the product maintains its paste form for as long as 8–10 hours.

FINAL OBSERVATIONS

Safest Stripper suggested retail prices are $3.79 per pint, $6.65 per quart, and $19.99 for a gallon—comparable in cost to other strippers. However, we used about twice the normal amount of stripper. To us, this added cost was more than worth it; we didn't have to buy rubber gloves, and we didn't have to worry about harmful fumes. If you live in a cold climate, where it's expensive to provide ample ventilation, this product may finally allow you to do indoor refinishing work during the winter.

3M product managers expect Safest Stripper will be available nationwide about January 1 at discount and hardware stores. For the dealer nearest you, call 612/736-1077.

Photo: Jim Kascoutas

		QTY.	TOTAL
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2-1/2" Medium Shaker Peg	$12.00 / 100		
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1-1/4" x 1/4" Hearts	$ 7.20 / 100		
1-1/4" x 1/2" Hearts	$ 8.50 / 100		
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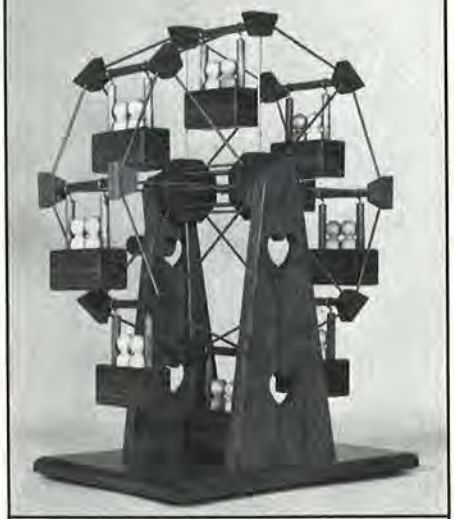

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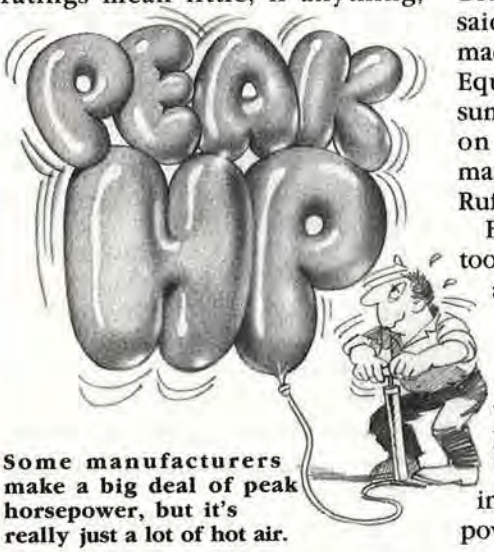
TOOL INDUSTRY INSIDER

BEWARE OF PEAK HP RATINGS

Many power tool manufacturers divide their tools into "industrial," "commercial," "professional," and "consumer" categories, with the consumer tools being the least expensive. Some companies promote tools with peak horsepower ratings (often emblazoned in big numerals on the tool), while their better-built (and more-expensive) big brothers usually don't have peak horsepower ratings. The reason? Probably because experienced tool users know that peak horsepower ratings mean little, if anything, about the tool's performance.



Some manufacturers make a big deal of peak horsepower, but it's really just a lot of hot air.

Peak horsepower refers to the maximum amount of horsepower a tool generates just prior to failure (motor stall), so it has little to do with the tool's actual performance under load. However, even nonpeak horsepower ratings can lie.

"If a manufacturer wants to put a 3 hp rating on a 2 hp motor, there's no stopping him, and there's a lot of this game-playing going on, both domestically and with imports," said Dean Ruffner, woodworking machinery product manager for Jet Equipment and Tools. "The consumer needs to look for a UL listing on the motor—if it has the UL mark, the rating should be correct," Ruffner added.

For another indicator of the tool's power, look at the machine's amperage. Ruffner told us of a tool Jet marketed with a 2 hp, 15 amp motor; another manufacturer sold a similar tool with the same motor and labeled it as having 3 hp. "But," Ruffner said, "that motor listed a 15 amp rating—a sure sign that it's the same power as our motor."

MAKITA GOES AFTER TAIWANESE IMPORTS

Perhaps you've noticed that several manufacturers sell power tools that look a whole lot like Makita products. Now, Makita's fighting back.

Makita USA, Inc. and Makita Corporation of America have filed a complaint with the International Trade Commission (ITC) charging 31 Taiwanese manufacturers and exporters, and US importers, with infringing on Makita trademarks.

Pat Griffin, Makita's vice president of marketing, says that recently, unauthorized copies of Makita products have become highly visible in the marketplace. "Our national sales force began spotting rip-offs of Makita products at trade shows and in retail outlets and advertising," reports Griffin. "We've heard about customers who were told that the tools come 'from Makita's back door' or 'from Makita's Taiwan plant.' We don't have a back door, and we don't make any tools in Taiwan."

According to Griffin, if the ITC issues an order against the offending products, the entire power-tool industry benefits. "The Taiwanese tools are poor-quality copies, and the public is being duped into believing otherwise," states Griffin.

Illustrations: Jim Stevenson

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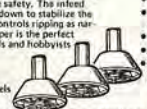

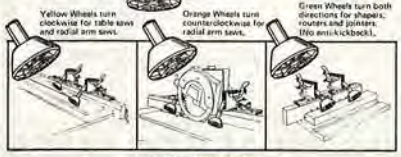
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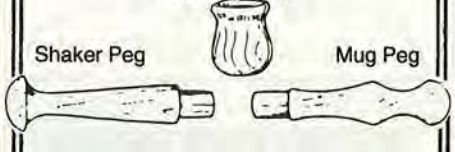

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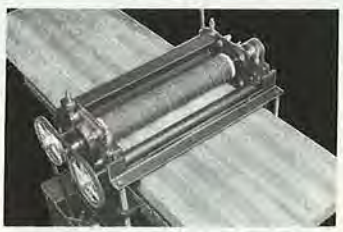

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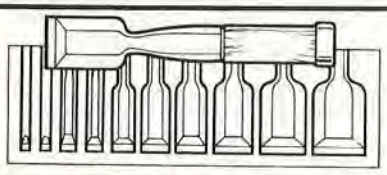

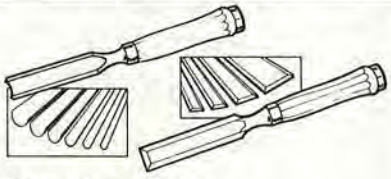

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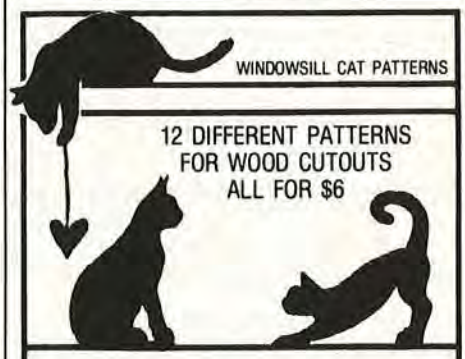

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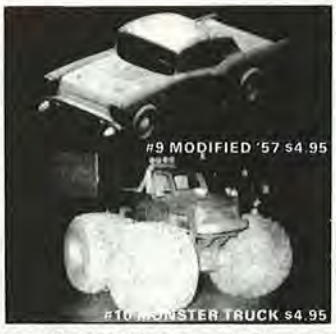

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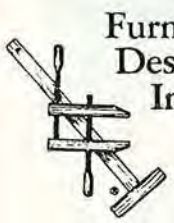

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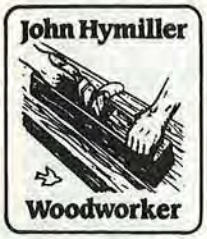

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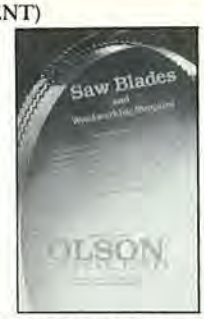

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69. Our wood parts make it easy to make professional looking furniture. We feature legs, arms & turned columns for tables, chairs, etc. in styles including Chippendale and Queen Anne plus chairs & occasional tables to assemble & finish. Our woods include walnut, mahogany, cherry & oak. ADAMS WOOD PRODUCTS brochure packet $1.00.

73. 192-page catalog from VAN DYKE'S is packed with restoration material for woodworking hardwoods, veneer, molding, carvings, turnings, tools, finishes and much more! Reproduction brass hardware, wood component pieces, oil lamp parts, caning material. $1.00.

62. Tools priced to sell! ACME ELECTRIC's 120 page catalog is packed with the finest brand name quality tools, equipment, and supplies for all your woodworking needs. Catalog $2.00.

66. At last an exciting new line of realistic wood block models that you can build with your own scrap wood and dowels and my easy-to-follow instructions. Highly detailed plans from 50 parts to 250 separate parts. Brochure 50¢. GATTO PLAN SUPPLY.

70. AMITY catalog features restoration systems, stripping chemicals, supplies and equipment. Hydrocote non-flammable finishes. Permafuse repair products. Amity's 1-2-3 wipe-on finishes, mirror silvering systems, and more! Catalog $1.00.

74. Classic through-dovetail joints cut accurately, quickly and easily. Fast, simple set-up, with beautiful results. Variable spacing, too! For drawers, boxes, giftware and furniture. Warranted 20 years. Three models available from KELLER DOVETAIL SYSTEM, "In a class by itself." Catalog $1.00.

The Basic Woodworking Series, Now on Video.

63. DRTV presents a home woodshop course on video. See woodworking tricks and techniques at home on T.V. Weekend woodworkers and professionals can learn by watching techniques actually used in this video series. Catalog $1.50.

67. For the first time ever, BLACK & DECKER is offering its line of Elu woodworking tools in the U.S. — sanders, routers, a power planer and a jointer/spliner — all with a wide range of accessories. ELU WOODWORKING TOOLS by BLACK & DECKER information $1.00.

71. TOOL CITY's 1987-88 giant 500 page catalog is the most complete mail order catalog. Priced to save you money in all categories. All types of power stationary and portable tools, hand tools and accessories. Send $5.00 for catalog now! Redeemable with first purchase.

RJS CUSTOM WOODWORKING

75. Full-size plans for fine furniture, home accessories, & toys featuring Plan Plus — the plan complete with hardware & hard-to-find components. All-American Tool Collection spotlights shop-tested USA made tools Catalog $1.00; refunded/1st order. RJS CUSTOM WOODWORKING.

64. 48-page catalog is filled with tools and supplies for decoy and wood carvers and wood turners including precision grinding tools, sharpening stones, Foredam tools, Fire Brush burners, pneumatic sanders, glass eyes, pewter feet and patterns. P.C. ENGLISH, INC. Free.

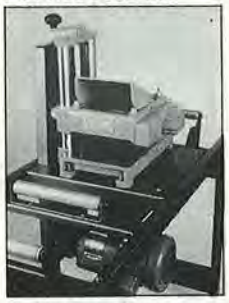
68. 1200 tools, patterns, veneers, thick and thin hardwoods, plywood, carving and turning stock. Hardwood bundles shipped UPS. Books, doweling jigs. Dowels, spindles, 2 plys, flexibles, cane, finishes, stain, inlays, edgings, burls, faces, and more! Catalog $1.00. MORGAN WOODWORKING.

72. Precise wide surface sanding at an affordable price is now available. You select the components to fit your budget and your needs. The Performax S/T Sander attaches to radial saw, to Stand Hardware Kit or the new Pro Stand. Manual Feed or optional Power Feed Conveyor unit can be added. Free brochure: PERFORMAX PRODUCTS, INC.

Cascade Precision Tool Co.

76. CASCADE TOOL COMPANY'S new 12-page catalog featuring over 300 S brand industrial quality carbide tipped router bits and shaper cutters. Best prices are available. The low overhead, factory direct way making our knives the best buy in the industry. Catalog $1.00.

77. Create an Heirloom with the complete clock builder's guide. Over forty traditional clock kits form $19.90 to $1690 plus countless components and plans for clockmakers who want to "build from scratch." Order direct from our factory for the best in quality and service. Free 32-page catalog. CRAFT PRODUCTS CO.



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82. If you are making toys and other items for craft shows and flea markets, don't overlook our great selection of patterns for rocking horses, toys, cars, clocks and furniture. Specialty supplies, hardware, tools and gift items also available. ARMOR PRODUCTS catalog $1.00.

78. The most comprehensive collection of gazebo plans found anywhere today. 55 gazebo designs, with a variety of styles and sizes to choose from. 1 plan in book, but all are available — average cost $18.00. Send $10.85 for book, includes postage. SUN DESIGNS.

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80. "Tools On Sale" offers a wide variety of tools for the professional or the do-it-yourself enthusiast. It is packed with some of the most respected names in the industry: Makita, Milwaukee, Skil, B & D, Ryobi, Delta, Bosch and many more. We are noted for our fast service and our friendly, knowledgeable sales people. Free Catalog. SEVEN CORNERS ACE HARDWARE.

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DELTA BENCH TOP TOOLS

Model		List	Sale
23-700	Wet/dry grinder	194	135
23-680	6" bench grinder ¼ H.P.	78	62
23-880	8" bench grinder ½ H.P.	133	99
23-960	10" bench grinder 1 H.P.	240	199
11-950	8" drill press	160	119
14-040	14" drill press	307	235
40-150	15" hobby scroll saw	173	125
28-150	10" hobby band saw	185	129
31-050	1" belt sander 2.0 amp.	93	69
31-460	4" belt/6" disc sander	173	125

DELTA STATIONARY

Model		List	Sale
34-761	10" unisaw 1½ H.P.	1715	1179
22-651	13" planer 2 H.P.	1586	979
34-429	10" tilting arbor bench saw 1½ H.P.	1435	999
28-243F	14" band saw w/stand, no motor	621	419
33-990	10" radial arm saw	695	539
11-072	32" radial drill press	473	360
37-280	6" motorized jointer	440	319
50-179	¾ H.P. 2 stage dust collector	435	339
37-154	Deluxe DJ-15 6" jointer w/¾ H.P. motor	1117	979

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33-050 8¼" Sawbuck
List Price 742 Special Sale 539!!

34-330 8¼" Table Saw 13 Amp
List Price 321 Special Sale 225!!

MILWAUKEE TOOLS

PRICE BUSTERS		List	Sale
0224-1	¾" drill 4.5A magnum	179	110
0234-1	½" drill 4.5A magnum	189	105
0244-1	½" drill 4.5A magnum	189	105
0222-1	⅜" drill 3.5A 0-1000 rpm	169	95
0228-1	⅜" drill 3.5A 0-1000 rpm	154	85
0375-1	⅜" close quarter drill	208	115
0379-1	½" close quarter drill	243	139
0212-1	¾" cordless drill w/spd.	263	149
6539-1	Cordless screwdriver 190 rpm	108	62
6540-1	Cdlss. screwdriver w/bits & cse	137	89
6545-1	Cdlss. screwdriver 200 & 400 rpm	120	72
3102-1	Plmbrs rt angle drill kit	295	175
3002-1	Electricians rt angle drill	290	169
5399	½" D-hdle ham drill kit	299	165
1676-1	H.D. Hole Hawg w/cs	395	235
6511	2 sp SawZall w/cs	209	119
6405	8¼" circle saw	209	120
6750-1	Drywall gun 0-4000 4.5A	149	89
6798-1	Tek screwdriver	173	105
6226	2 sp bandsaw w/case	416	240
6234	TSC bandsaw w/case	427	279
6507	TSC SawZall w/case	219	129
6170	14" chop saw	430	295
6012	Orbital sander 3⅝"x7¾"	179	100
6014	Orbital sander 4½"x9¼"	189	110
6305	6¼" cordless circle saw	284	155
6753-1	Drywall gun 0-4000 3.5A	129	77
8977	Var. temp heat gun	109	70
0214-1	⅜" v. spd. cordless drill	220	125
5397-1	½" v. spd. hammer drill kit	227	145
5371-1	½" v. spd. hammer drill kit	313	199
3107-1	½" v. spd. rt angle drill kit	305	180
6754-1	Drywall gun 0-4000 4.5A	179	115
6232	4½" bandsaw w/case	432	275
6747-1	Drywall driver-0-2500	149	87
0230-1	⅜" drill 0-1700 rpm	169	99
3300-1	½" v. spd. magnum rt angle kit	289	180
5620	Router 1 H.P.—8 amp	289	169
5660	Router 1½ H.P.—10 amp	299	180
5650	Router 2 H.P.—12 amp	350	205
5455	⅞" polisher 1750 rpm	199	125
5535	7" polisher 2800 rpm	209	130
6215	16" chain saw	280	189
6975	Heat gun	85	55
6366	7¼" circular saw	198	112
6368	7¼" circular saw w/case	226	125
0216-1	2 spd cordless drill Hi-torque	222	134
0235-1	½" drill keyless chuck mag	199	123
6016	¼ sheet pad sander	75	44
6145	4½" grinder 10,000 rpm	149	95
8950	8 gal wet/dry vac	205	139
8955	10 gal wet/dry vac	279	189
0239-1	½" drill keyless chuck	189	114
6749-1	Drywall gun 0-2500 4.5A	189	117
6377	7¼" worm drive saw	275	155

FREUD SAW BLADES

⅝" Bore—Industrial Grade
CARBIDE TIPPED SAW BLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen. Purp. A.T.B.	10"	40	77.49	34
LU81M010	Gen. Purp. TiCh.	10"	40	79.32	39
LU82M010	Cut-off	10"	60	98.89	42
LU84M011	Combination	10"	50	85.25	36
LU85M010	Super Cut-off	10"	80	125.90	50
LM72M010	Ripping	10"	24	74.22	31
LU73M010	Cut off	10"	60	91.16	37
PS203	Gen'l Purp	7¼"	24	31.42	16
PS303	Plywood	7¼"	40	37.74	22
DS306	6" Dado - Carbide			168.13	95
DS308	8" Dado - Carbide			205.89	108
F0	1¾"x⅜" Biscuits 1000-Qty.				25
F10	2⅛"x¾" Biscuits 1000-Qty.				25
F20	2¾"x1" Biscuits 1000-Qty.				25
FA	Assorts Biscuits 1000-Qty.				28
WC104	4 pce. chisel set w/cse ¼"-1"			39	27
WC106	6 pce. chisel set w/cse ¼"-1"			52	36
WC110	10 pce. chisel set w/cse ¼"-1½"			88	59
FB100	16 pce forstner bit set ¼"-2½"			262	152
94-100	5 pce router bit door system			260	159
JS100	Biscuit Jointer			285	154

MAKITA CORDLESS

Model		List	Sale
6070DW	⅜" var. spd. rev. 7.2v	123	65
6071DWK	⅜" var. spd. rev. w/removable batt.	190	105
5090DW	3⅜" saw kit	243	125
5600DW	6¼" circular saw	317	167
6010DWK	⅜" cordless drill kit	155	89
6010DSDW	⅜" cordless drill	103	58
DA3000DW	¾" angle drill	238	130
4390DW	9.6 volt cdls. recip saw kit	218	122
6010DL	¾" drill w/flashlight	198	113
6012HDW	2 spd. driver drill w/clutch & case*	224	109
6710DW	Cordless screwdvr kit	176	103
6092DW	V/spd. & case*	237	117
6093DW	V/spd. w/clutch & case*	248	119
6891DW	Drywall gun 0-1400	225	120
DK1001	6010 DWK drill kit comp. & 4071D vac. cleaner	376	115
632007-4	9.6 volt battery	49	28
632002-4	7.2 volt battery	42	27
5007NBA	7¼" saw w/elec. brake	219	127
5006NBA	8¼" saw w/elec. brake	257	145
804510	Sander	97	48
9900B	3"x21" belt sander w/bag	254	139
9924DB	3"x24" belt sander w/bag	260	145
9035	⅓ sheet finish sander	100	58
9045B	½ sheet finish sander	204	116
9045N	¼ sht fin. sand. w/bag	206	117
4200N	4½" circ. saw 7.5 amp	210	111
5201NA	10¼" circ. saw 12 amp	509	300
4301BV	Orb. v/sp jig saw 3.5 amp	268	145
JR3000WL	2 sp recip saw w/cse	217	122
JR3000V	Vs. recip saw w/case	228	125
LS1020	New 10" mitre saw	426	229
9820-2	Blade sharpener	336	199
410	Dust collection unit	458	269
3705	Offset trimmer	240	132
1900BW	3¼" planer w/case	210	115
1100	3¼" planer w/case	381	185
9207SPC	7" sander-polisher	276	139
3601B	1⅜ H.P. router	228	125
3700B	½ H.P. trimmer	170	92
9501B	4" grinder	137	65
804530	6" round sander	102	57
804550	¼" pad sander w/bag	95	46
0A3000R	¾" angle drill	234	133
DP4700	½" v/sp w/rev. 4.8 amp	192	109
6300LR	½" angle drill w/rev	316	176
2708W	8¼" table saw	432	258
2711	10" table saw w/brake	728	460
GV5000	Disc sander	120	67
5800DB	2500 rpm 3.5 amp	154	77
5800DBV	0-2500 rpm 3.5 amp	164	87
5801DB	4000 rpm 3.5 amp	154	80
5801DBV	0-4000 rpm 3.5 amp	164	88
2030N	12" planer/jointer	2836	1579
2040	15½" planer	2358	1379
1805B	6¼" planer kit w/case	609	340
JV1500	var. speed jig saw	209	127
JV2000	var. speed orb. jig saw	230	137
5005BA	5½" circular saw	202	115
9503BH	4½" sander-grinder	153	83
DP3720	⅜" drill rev. 0-1800 rpm	134	55
6510LVR	⅜" drill rev. 0-1500 rpm	153	72
6013BR	½" drill rev. 6 amp	224	125
5402A	16" circular saw - 12 amp	550	325
3612BR	3 H.P. plunge router	354	179
9401	4"x24" belt sander w/bag	302	162
3620	1¼ H.P. plunge router w/cse	180	97
4302C	V/spd. orb. jig saw	272	155
5077B	7¼" Hypoid saw	254	145
LS1430	14" Mitre saw	624	419
2414	14" cut-off saw AC/DC	365	195
5007NB	7¼" circ saw 13 amp	196	114
3612B	3 HP plunge router sq/b	354	179

SKIL SIZZLERS

Model		List	Sale
5510	(551) 5½" circ saw	112	92
5625	(552) 6½" circ saw	175	110
5656	(553) 7¼" circ saw	132	103
5665	(554) 8¼" circ saw	204	118
5750	(807) 7¼" circ - drop foot	198	115
5765	(808) 8¼" circ - drop foot	216	130
5790	(810) 10¼" circ - drop foot	400	229
5825	(367) 6½" worm saw	229	139
5865	(825) 8¼" worm saw	250	149
4580	Vari - orbit jig saw w/cse.	144	82
3810	10" Mitre saw	263	189
595	3"x21" sander w/bag 5.5A	197	125
7565	¼" palm sander	52	34
7313	3x18 belt sander 4.5A	72	58
77	7¼" worm drive	230	132
77-50	7¼" worm drive "Gold Edition" w/carbide blade	271	137
5350	2½ HP circ. saw	80.99	69
5250	2¼ HP circ. saw	68.99	49

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28-283F 14" Band Saw w/enclosed stand & ¾ H.P. motor **599.00**

43-122 Lt. Duty Shaper w/stand & 1 H.P. motor **499.00**

17-900 16½" Floor Drill Press **269.00**

40-601 18" Scroll Saw w/stand and blades **679.00**

DELTA #34-080 10" MITRE BOX
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PIRANHA By Black & Decker
CARBIDE TOOTH SAW BLADE

Model#	Diameter	#Teeth	List	Sale
73-756	6-1/2	36	26.90	16.30
73-717	7-1/4	18	11.72	7.10
73-737	7-1/4	24	14.92	9.00
73-757	7-1/4	40	27.40	16.35
73-758	8	40	39.90	24.15
73-759	8-1/4	40	40.66	24.60
73-739	9	30	29.52	17.85
73-769	9	60	64.40	38.95
73-740	10	32	30.98	14.00
73-770	10	60	64.90	25.00
73-715	5-1/2	16	13.25	7.30

STYLE 32 PONY SPRING CLAMPS
with coated tips and handles

Model	Size	List	Sale Ea.	Lots of 25
3201-HT	1"	1.79	1.10	24.75
3202-HT	2"	2.78	1.65	37.15
3203-HT	3"	5.09	3.00	67.50
3204-HT	4"	8.63	5.15	115.85

ADJUSTABLE HANDSCREWS BY JORGENSEN

Item No.	Jaw Length	Open Cap	List	Sale	Box of 6
#5/0	4"	2"	12.05	7.25	40.50
#4/0	5"	2½"	12.95	7.95	45.30
#3/0	6"	3"	13.88	8.35	47.60
#2/0	7"	3½"	14.92	8.95	51.00
#0	8"	4½"	16.61	9.95	56.70
#1	10"	6"	18.98	11.40	64.95
#2	12"	8½"	21.78	13.00	74.00
#3	14"	10"	27.62	17.50	99.95
#4	16"	12"	35.93	23.00	139.95

STYLE 37 2½" Throat ¼"x¾" JORGENSEN

Item No.	Jaw Length	List	Sale	Box of 6
3706	6"	8.27	5.50	29.70
3712	12"	9.17	5.95	32.50
3718	18"	10.12	6.85	37.50
3724	24"	11.07	7.35	40.00
3730	30"	12.35	8.25	45.00
3736	36"	13.49	8.95	49.00

PONY CLAMP FIXTURES

		List	Sale	Lots of 12
50	¾" black pipe clamps	11.68	7.50	80
52	½" black pipe clamps	8.73	6.00	65

STYLE J. ADJUSTABLE HANDSCREW KITS

Model	Length Jaws	List	Sale
J04	4	5.47	3.75
J06	6	7.38	4.25
J08	8	8.31	4.80
J10	10	9.69	5.75
J12	12	12	6.90

BOSCH

Model		List	Sale
1581VS	Top hdle. jig saw	235	129
1582VS	Barrell grip jig saw	220	119
	Bosch metal case for above jig saws	34	26
	Bosch blade assortment for jig saws 30 of Bosch's best selling blades	23.99	
1942	Heat gun 650°-900°	99	69
1272D	3"x24" B.S. w/bag	295	169
1273D	4"x24" B.S. w/bag	315	179
11-212	Bulldog ¾" SDS rotary	339	189
1196VSRK	⅜" vs hammer drill	205	110
1198VSR	½" vs hammer drill	219	125
1608	5.6 amp lam trimmer	135	75
1608L	Same as above w/trimguide	139	81
1608T	5.6 amp tilt base trim	155	89
1609	5.6 amp offset base trim	199	119
1609K	Lam installers kit w/1609	285	154
	Offset base, trimmer tilt base, trimguide, ¼" collet, collet nut, wrenches, hex keys and case		
1601	1 H.P. Router 25,500 rpm	159	95
1602	1½ H.P. Router 25,000 rpm	195	109
1603	1½ H.P. D handle Router	219	119

The famous Bosch 1604 1¾ h.p. Router
List $219 Super Spec. $112

1606	1¾ H.P. D hdle. Router	243	135
3258	3¼" planer w/blade guard 5.7 amp	205	119
3270D	3"x21" belt sander w/bag 5A	219	129
1273DVS	Var spd. 4"x24" 6 speed range sander 10.5 amp	339	189
1611	3 H.P. plunge router	339	198
1551	7¼ 13 amp. circ. saw	179	99
1922K	Cdlss. jig saw w/cse.	239	159
921VSRK	⅜" cdlss. drill v/spd. w/clutch and case	235	137
1632VSRK	Recip. saw 8.4A orb. v/spd.	215	129

WORKMATES BY BLACK & DECKER

Model		List	Sale
79-029	#85, 18#	57.95	39.00
79-032	#200, 23#	97.95	65.00
79-033	#300, 28#	107.95	70.00
79-034	#400, 35#	148.95	98.00

NEW by Black & Decker!
Bullet Drill Bit Sets

Model		List	Sale
14347	8 piece 1/16 to ¼ HSS	18.45	12
14350	11 piece 1/16 to ¼ HSS	27.18	15
14353	14 piece 1/16 to ½ HSS	49.03	29
14356	21 piece 1/16 to 3/8 HSS	86.50	49
14359	29 piece 1/16 to ½ HSS	162.75	89

Black & Decker Deals

1707	8½" crosscut mitre saw	795	469
2037	0-4000 5 amp drywall gun	160	92
1703	10" mitre saw w/73-700 blade	313	159
2660	0-4000 4.5 amp drywall gun	138	87
4015	½ sheet sander 3 amp	190	109
2600	⅜" 0-1200 4.5 amp drill	119	76
4018	½ sheet sander 2.3 amp	122	74
3051	7¼" worm drive 13 amp	245	142
3027-09	7¼ circ. saw 10.5 amp	170	75
3103	2 spd recip w/case	190	95
3028	7¼" circ w/18 tooth carb bld.	125	75
3047-09	7¼" super saw cat w/brake	270	164
3048-09	8¼" super saw cat w/brake	285	174
3157	Orb v/spd. jig saw	212	125
3153	V/spd. jig saw	205	121

RYOBI SPECIALS

Model		List	Sale
R500	2¼ H.P. plunge router	326	159
S500A	⅛ sht. finish sander	70	36
TS251IU	10" mitre saw	392	169
TS251IUS	10" mitre w/acc. kit & 60 tooth carbide blade	435	199
AP10	10" surface planer 13 amp.	820	358
TS380	14" mitre saw	773	339
W640	7¼" AC/DC dbl insul.	210	99
R150K	1 H.P. plunge router w/cse	206	95
E3810	0-2500 3.7A drywall gun	143	69
RJ102K	2 sp. 6A recip saw w/cse	218	89
W740C	8¼" AC/DC dbl insul circ saw	234	115
BE321	3"x21" v/spd. belt sdr.	259	119

PORTER CABLE

Model		List	Sale
630	1 H.P. router 6.8 amp	165	110
690	1½ H.P. router 8 amp	205	115
691	1½ H.P. router D hdle	225	132
536	1½ H.P. speedmatic router	300	195
518	3 H.P. 5 speed router	520	325
520	3 H.P. 15 amp router	490	298
309	3.8 amp lam trimmer	135	85
310	3.8 amp H.D. lam trimmer	190	114
312	Offset base lam trimmer	205	120
319	Tilt base lam trimmer	221	129
695	1½ H.P. router/shaper	288	190
696	H.D. shaper table	160	105
351	3"x21" belt sander w/o bag	207	119
352	3"x21" belt sander w/bag	217	122
360	3"x24" belt sander w/bag	302	179
361	3"x24" belt sander w/o bag	282	170
362	4"x24" belt sander w/bag	317	189
363	4"x24" belt sander w/o bag	302	180
7556	½" right angle drill	290	175
315-1	7¼" top hdle 13 amp circ saw	185	105
617	7¼" pushhandle 13 amp	185	105
368-1	8¼" top handle 13 amp	195	131
314	4½" trim saw 4.5 amp	195	125
548	X HD bayonet saw	245	165
9548	X HD bayonet saw w/case	265	175
9629	Recip saw v/sp 8 amp	225	135
9627	Recip saw 2 speed 8 amp	215	129
666	¾" H.D. vsp drill - Hdl	181	122
620	¾" H.D. 4 amp 1000 rpm	140	83
621	¾" H.D. v spd. 0-1000 rpm	148	90
320	Abrasive plane 3 amp	145	98
126	Porta plane 7 amp	280	164
9118	Porta plane 7 amp kit	315	185
653	Versa plane 10 amp	399	250
9652	Versa plane 10 amp kit	419	275
7545	0-2500 v spd. drywall gun 5.2 amp	153	100
505	½ sheet pad sander	187	99
7511	⅜" v spd. drill 5.2 amp	183	100
7514	½" v spd. drill 0-750	188	115
303	Paint remover	220	150
304	7" disc sander 4000 rpm	187	125
305	7" disc polisher 2000 rpm	187	125
367	3¼" planer 6.5 amp	225	135
537	1½ H.P. D hdle router	315	205
7548	Top hdl jig saw 4.8 amp	205	129
7648	Barrel grip jig saw 4.8 amp	205	129
338	Speed block sander ¼ sht	97	53
555	Plate biscuit jointer 5A w/cse.	269.95	158
345	6" saw boss 9 amp	154.50	95
5060	"Stair Ease" stair templet	194	125
5061	"Stair Ease" hard wood stair templet	204	135
655	0-4000 drywall gun 4 amp	125	74
7540	0-4000 5.2 amp gun	158	99
100	⅞ H.P. router	155	94
59381	Door hanging kit	224	152
399	Drywall cutout unit	104.50	69
43218	Drywall cutout unit bit	6.75	5.50
5008	Dovetail template kit	95	69
5009	Mortise & Tenon jig	49.95	38
348	3 amp 3500 spm jig saw	143	88

—BRAND NEW—
By Porter Cable

Model		List	Sale
9647	TIGER CUB recipro saw	185	115
9850	12 volt cordless driver/drill comp w/charger-batt-case	210	129
8500	Extra 12v battery	48	33

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Print this article

A WOMAN'S TOUCH

In do-it-yourself furniture refinishing, women take the scraper in hand almost as often as men. According to refinishing expert Homer Formby, a nationwide consumer survey of almost 3,800 people showed that 46 percent of home refinishers were women, 54 percent men.

THE RIGHT WAY

The late Eric Sloane, in his book *A Reverence for Wood*, notes that the Shakers religious sect, which specialized in woodworking, believed anything going to the left ungodly. The lap ends of their round boxes always turned right, and their furniture (shown *right*), he says, was a masterpiece of "right angles."

The Shakers applied religious principles to woodworking. Their designs featured right angles and simple lines.

A TREE SMORGASBORD

South America's rain forests rate as the world's lushest habitat for trees. For instance, one particular 2½-acre patch of forest in the Amazon River basin near the border of Brazil and Venezuela contains 283 species of trees! And, according to Dr. Alwyn Gentry, rain-forest traveler, biologist, and curator of the Missouri Botanical Gardens in St. Louis, there are hundreds of such places. Trees grow so abundantly that untold species have never been botanically classified and cataloged.

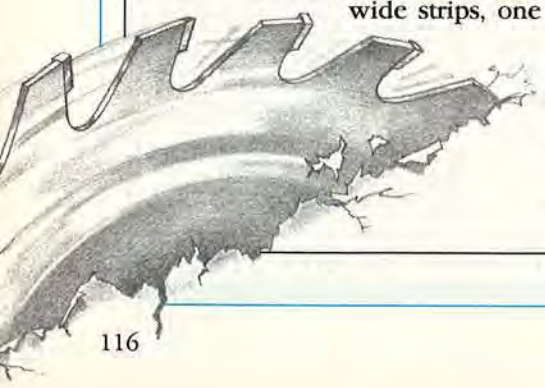
Why do trees in the Amazon grow so prolifically? Dr. Gentry says there are several widely accepted theories for their profuse growth. Among them, one has it that the region's nonseasonal, greenhouse-type weather allows trees to specialize (develop more species). Another theory cites the forest's unusual, dynamic atmosphere—quick-sprouting new growth, development, and maturity achieved so rapidly that new species easily find a niche. A third pinpoints the consistantly high moisture level that reduces stress so all plants thrive.

HOW TO MAKE SAWDUST

New-car testing results in collision damage. New saw-blade testing results in sawdust—lots of it!

Before Disston put the carbide, variable-tooth Tiger Force circular saw blade on the market, they matched it against other brands in a marathon saw-off. Four-by-eight sheets of ⅝" particleboard were reduced to 1"-wide strips, one cut at a time. After a month's worth of cutting, each blade had gone through 28,000 linear feet of board—adding up to more than 5 miles! "The shop," said a spokesman, "was always buried in about 6" of sawdust."

An independent testing lab worked with Disston on the comparative sawing project. According to test figures published by the saw company, the Tiger Force beat Black and Decker's Piranha, Omark Industries' Cuda, and Vermont American's Laser X2 in both initial cutting speed, cutting speed after 28,000 feet, and smoothness of cut.

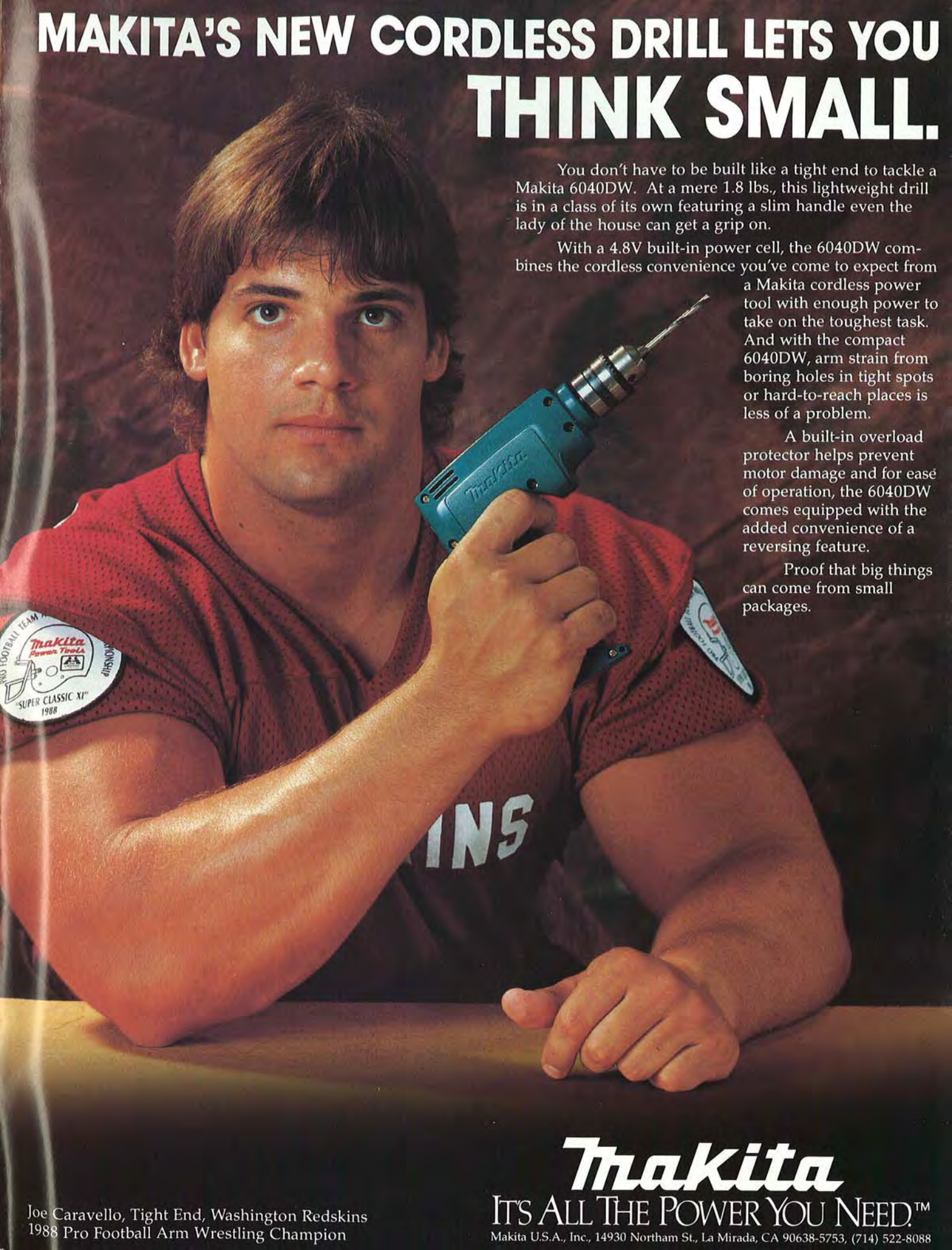


CALLING ALL CARVERS

Of all the reader questions we receive, one of the most frequent asks: "Where can I meet other carvers?" We know of many carving clubs across the country, but there are plenty we haven't heard about. Will you help us? If you belong to a carving club, send us the name of the club, tell us its size, and give us the name and address of the president. Write: Carvers, *WOOD*® magazine, Locust at 17th, Des Moines, IA 50336. As a thank-you, we'll send you two full-sized patterns. In case of multiple responses from the same club, the earliest postmark applies. The compiled club list will help lonely carvers we hear about!

Illustrations: Jim Stevenson Photograph: Bob Calmer

MAKITA'S NEW CORDLESS DRILL LETS YOU THINK SMALL.



You don't have to be built like a tight end to tackle a Makita 6040DW. At a mere 1.8 lbs., this lightweight drill is in a class of its own featuring a slim handle even the lady of the house can get a grip on.

With a 4.8V built-in power cell, the 6040DW combines the cordless convenience you've come to expect from a Makita cordless power tool with enough power to take on the toughest task. And with the compact 6040DW, arm strain from boring holes in tight spots or hard-to-reach places is less of a problem.

A built-in overload protector helps prevent motor damage and for easé of operation, the 6040DW comes equipped with the added convenience of a reversing feature.

Proof that big things can come from small packages.

Joe Caravello, Tight End, Washington Redskins
1988 Pro Football Arm Wrestling Champion

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2 HP - 1 Ph	$1459*	2 HP - 3 Ph	$1399*
2 HP - 3 Ph	$1489*	2 HP - 1 Ph	$1399*

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